AIR CAMPAIGN

TRUK 1944–45

The destruction of Japan's Central Pacific bastion

MARK LARDAS | ILLUSTRATED BY ADAM TOOBY

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INTRODUCTION

The United States opened the siege of Truk with a massive carrier airstrike, ending Truk's effectiveness as a naval base and compromising its use as an airfield. This photo shows a Japanese cargo ship torpedoed and sunk on that strike's first day. (USNHHC)

Truk: in the early years of the Pacific War, that word brought anxiety to Allied war planners. Truk Atoll was the Imperial Japanese Navy's advance anchorage in the Central Pacific. Nearly 2,000nmi from Japan's Home Islands, it was the springboard for the Japanese when they attacked the Gilberts, the Bismarck Archipelago off New Guinea, and the Solomon Islands. Samoa and the Fijis were vital stepping stones in the supply route between Australia and the United States, and were closer to Truk than Pearl Harbor was to Japan. Truk could even support an invasion of Australia.

The Japanese offensive in the winter of 1941–42 saw Japan capture many islands in the Central Pacific. It created another view of Truk, that of a giant spider in the middle of a web of islands. Aircraft from Truk reinforced Japan's outer defensive perimeter in the Gilberts and Marshalls. Truk was the ferry point from which naval aircraft were ferried to Rabaul and from there into the Solomons and New Guinea. Ships of the Combined Fleet slipped out of Truk to attack Allied naval forces defending Guadalcanal or Port Moresby, retarding the Allied advance up the Solomons chain.

The fears of Truk as an offensive launch pad were exceeded only by fears of its strengths as a defensive bastion. Japan captured Truk from Germany during World War I. Through the intervening years, Japan kept outsiders out of Truk. During World War I, Japan discouraged its Allies from visiting. After the war ended, especially after Truk was awarded to Japan as part of a League of Nations mandate, a curtain fell around it, with only Japanese nationals permitted to visit. The atoll's natives never left it.

In the absence of real information, the Australian, US, and British intelligence services had only their imaginations to guide them; and their imaginations ran wild. Truk was seen as a heavily fortified Japanese outpost. They called it "Japan's Pearl Harbor" as if it were as large and developed as the US Pacific Fleet's base at Oahu. They also called it "The Gibraltar of the Pacific," conjuring images of vast defensive works. Allied intelligence officers knew the Japanese had had over 25 years to fortify Truk. They knew what they could have done in that amount of time, and expected no less from them, especially since the Japanese repeatedly

disregarded international treaties during that time period. Perhaps Truk's defenses were on the scale of Fort Drum in Manila Bay? They *had* to be extensive, especially given Truk's strategic importance to Japan.

However, the reality was somewhat different. During the 1920s and 1930s, Japan had respected treaty obligations not to fortify Truk. The Imperial Japanese Navy (IJN) directly administered Truk during World War I, but control transferred to the navy's Civil Affairs board in 1920. After 1929, Truk was administered by Japan's Ministry of Colonial Affairs, a civilian agency. Indeed, up until November 1939, there were no military installations on any island in Truk Atoll.

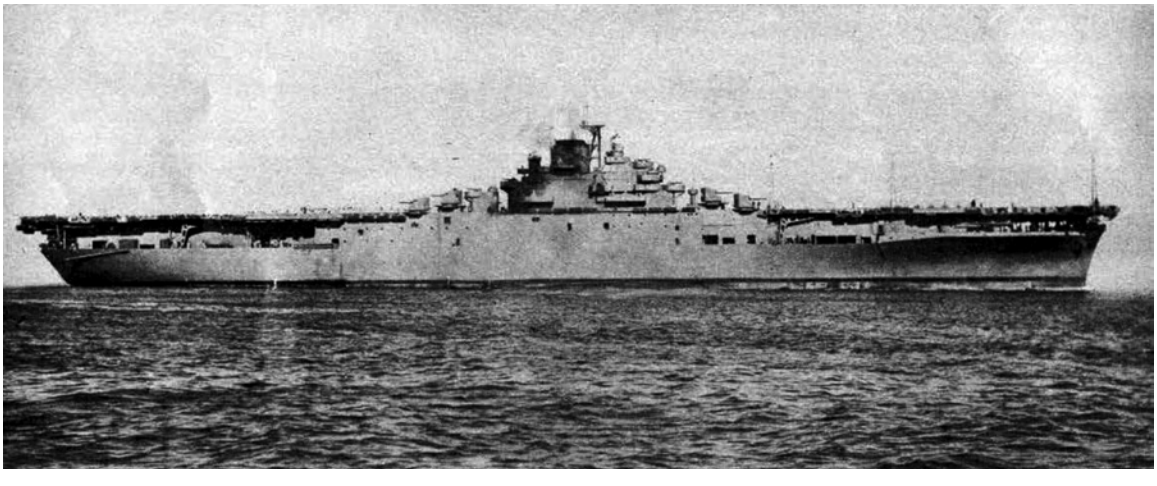
This is not to say that Japan ruled Truk with a light hand. They isolated its native inhabitants from the world, and renamed the islands within Truk Atoll, replacing native names with Japanese names. *Dublon* was renamed *Natsu Shima* – Summer Island. (*Truk* was a corruption of the native word for the place: *Chuuk*. *Chuuk* means "mountain" in the native language.) Japan exploited Truk for its tropical produce, but wasted little effort on economic development. Their interest was more in denying Truk to nations that were potential rivals for control of the Central Pacific.

When the Germans had ruled Truk, they set up their administrative center at Dublon Town. Japan expanded it, but not much beyond the needs of the civilian government that ruled Truk for most of the 1920s and 1930s. There was a dock with a few sampans and barges for lighter goods, and a small tank farm. Truk's administrators were housed in wood-framed office buildings with concrete foundations and corrugated metal roofs.

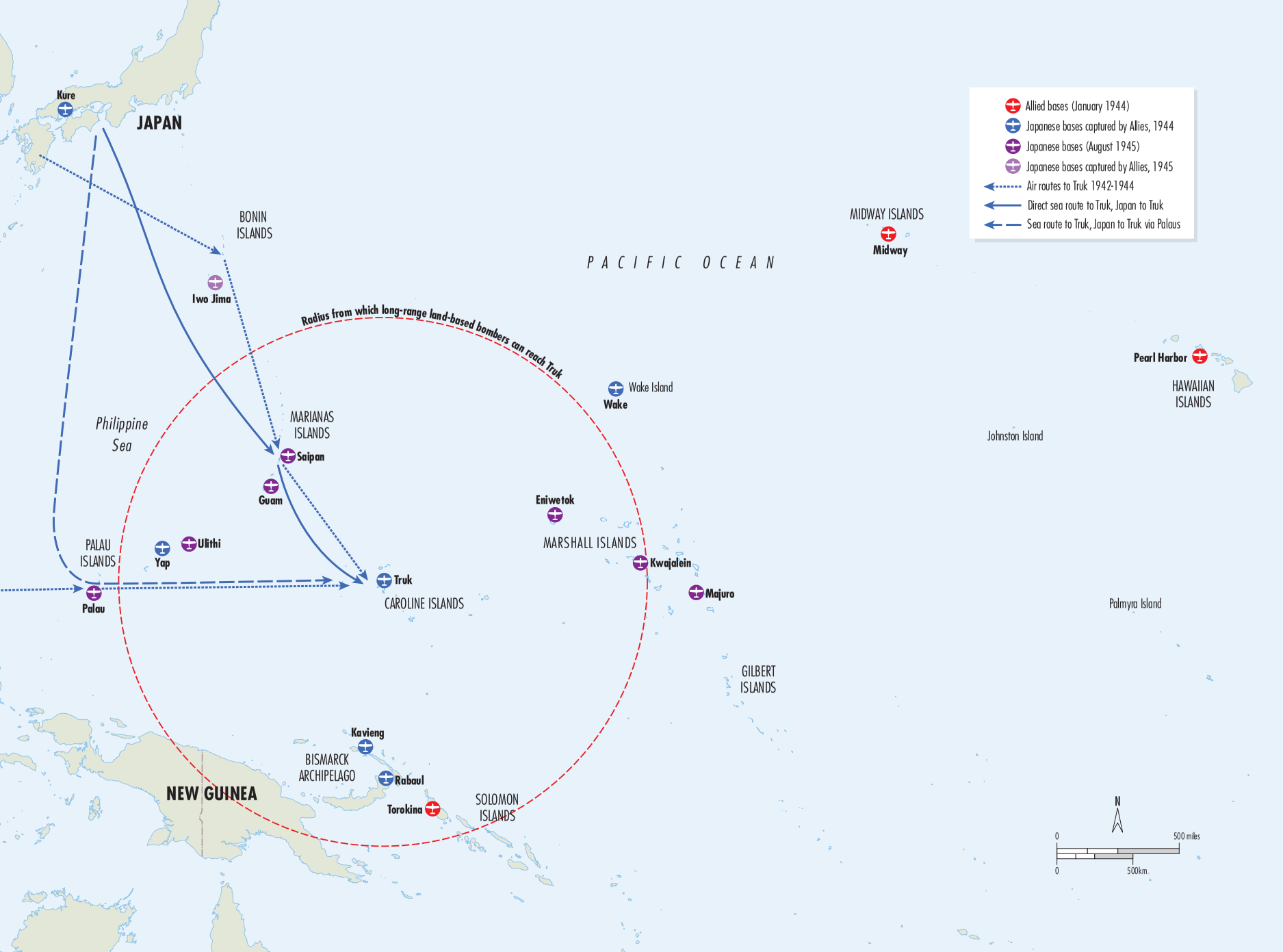
The lack of fortifications was less due to Japan's regard for international law than to Japan's economic limitations. It could not afford both a large navy and extensive naval fortifications. It opted to build up its naval forces, neglecting fixed defenses. With a strong enough navy, there would be no need for extensive defenses, for no enemy could get close enough to test them.

When what became World War II started in Europe, in September 1939, all this changed. The war drew British, Commonwealth, and French resources to Europe. It also had the potential to involve the United States, the Netherlands, and Portugal – the remaining western nations with interests in Asia and the Pacific. Japan decided to prepare for any expansion opportunities offered by western nations' European preoccupation.

Truk's location made it vital to Japan's Central Pacific defensive and offensive plans. It had a magnificent and sheltered anchorage: within its lagoon lay islands large enough for surface fleet shore facilities and airfields to station the Imperial Navy's aircraft. From Truk, the Navy could defend Japan's network of Central Pacific Islands and strike deep into territories held



Truk was not the first Allied attempt to isolate an enemy bastion through air power alone, but was the first in which carrier aircraft formed the main effort. This was possible due to the arrival of Essex-class carriers, which allowed hundreds of aircraft to be used. (AC)


Allied bases (January 1944)
Japanese bases captured by Allies, 1944
Japanese bases (August 1945)
Japanese bases captured by Allies, 1945
Air routes to Truk 1942-1944
Direct sea route to Truk, Japan to Truk
Sea route to Truk, Japan to Truk via Palaus
Kure
JAPAN
BONIN ISLANDS
Iwo Jima
Radius from which long-range land-based bombers can reach Truk
Philippine Sea
MARIANAS ISLANDS
Saipan
Guam
PALAU ISLANDS
Yap
Ulithi
Palau
Truk
CAROLINE ISLANDS
Wake Island
Wake
Eniwetok
MARSHALL ISLANDS
Kwajalein
Majuro
MIDWAY ISLANDS
Midway
PACIFIC OCEAN
Pearl Harbor
HAWAIIAN ISLANDS
Johnston Island
Palmyra Island
GILBERT ISLANDS
Kavieng
BISMARCK ARCHIPELAGO
Rabaul
Torokina
NEW GUINEA
SOLOMON ISLANDS
N
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OPPOSITE PACIFIC THEATER 1944

by Japan's potential foes: Australia, Great Britain, and the United States. In November 1939, Japan finally began transforming Truk into a naval and air base for the Imperial Navy.

A naval port and a logistics center were added to Truk prior to Japan's entry into World War II. Truk became headquarters for the Fourth Fleet, assigned to protect the Central Pacific. The seaplane base at Dublon, the only air facility in Truk prior to 1940, was expanded. Airfields were constructed at Moen Island, with one doubling as a second seaplane base. After the Pacific phase of World War II began, airfields were also built on two other islands: Eten and Param. Despite Allied worries, none of these facilities were extensive. They were barely adequate for Japan's need, improvised rather than deliberate. Repair and maintenance facilities were rudimentary; logistics were sparse and underdeveloped. Japan's weak economy simply did not permit it to build facilities in the necessary depth.

Japan did not fortify Truk heavily: it did not need to. Truk's natural defenses were sufficient to protect it from invasion, with minimal preparation. Once passes giving entry into its lagoon were mined and covered by shore batteries, Truk was impossible to invade, except at

The US Army Air Force played an unglamorous, yet vital, role in the reduction of Truk. Army Air Force raids rarely had more than two dozen aircraft, yet these nearly daily raids, as shown here, prevented the Japanese from rebuilding their facilities. (USAF)

prohibitive cost. The guns sent to provide Truk's shore batteries dated to the Sino-Japanese War of 1895, but they were more than adequate for their purpose.

Truk's air garrison would shield Truk from the other threat: air assault. In 1939, and until 1941, Japan had the world's best naval aircraft and aircrew. Its Navy felt they could send Truk enough of both to keep potential attackers far away. Japan never manufactured enough antiaircraft guns to provide Truk with strong antiaircraft defenses, but it sent enough to deal with the presumably small number of aircraft that might penetrate Truk's inner defenses after meeting Truk's aircraft.

Truk served as the launching point for Japan's Central Pacific and Southwest Pacific offensives in 1941 and 1942. In 1943, Truk was the center through which Japan's forces were funneled to protect early-war gains. However, as 1944 approached, Truk's role was changing. The United States and the other Allies had penetrated the outer defensive perimeter Japan had established in the war's first six months. The Allies had retaken the Gilbert and Solomon Islands, and had begun pushing the Japanese back in New Guinea and New Britain. Plans were also in progress to capture the Marshall and Marianas islands.

The Allies were left with the question of what to do with Japan's Caroline Islands. Truk, Yap, and Peleilu were Japanese strongholds. Advancing past the Marshalls and New Guinea, whether to the Philippines or the Marianas, meant dealing with these islands, especially Truk. Truk was too important, too centrally located for the Allies to allow it to remain a threat to their supply lines. The road to Tokyo might not run through Truk, but it ran within air range of it.

Two schools of thought existed within the ranks of Allied planners. One held Truk had to be taken: only a US presence could neutralize the threat posed by its airfields, and its magnificent anchorage could be used by Allied fleets. A second school offered a more radical solution: Truk need not be occupied to be neutralized. Some believed that Allied air power could neutralize Truk. With Truk's aircraft gone and airfields ruined, Truk would be unusable by the Japanese Navy. Without a fleet or aircraft, Truk posed no threat to an Allied advance past it. Truk could thus be bypassed, with troops committed to its invasion and occupation being used elsewhere.

As 1944 opened, the Allies' course of action against Truk was not yet determined, although everyone agreed it must be neutralized. Few were convinced it could be neutralized through air power alone, but planners were willing to consider using aerial forces.

An incremental campaign was planned. The Allies anticipated gaining airfields in the Marshall Islands from which Truk could be bombed in the opening months of 1944. A carrier air strike preceded the invasion of Kwajalein in the Marshalls by two months. A similar strike was needed if Truk was to be invaded. That strike could test whether Truk could be subdued using only air power. If successful enough to allow unescorted heavy bombers to keep Truk neutralized, an invasion could be skipped. What became one of World War II's most successful uses of air power thus began, a probing attack intended to test the concept of aerial power bypassing enemy strongholds.

CHRONOLOGY

1914
October Japan captures Caroline Islands, including Truk, from Germany at the start of World War I.

1920
Truk transitions from direct Navy administration to control by the Civil Affairs Board.

1922
The League of Nations grants Japan a mandate to the Carolines.

1929
The administration of Truk transitions from the Civil Affairs Board to the Japanese Ministry of Colonial Affairs.

1933

Japan withdraws from the League of Nations, but maintains control of its League of Nations mandate territories.

1939

November 15 The IJN Fourth Fleet is organized with the mission of protecting mandated islands. Truk is chosen as its anchorage and headquarters.

1940

November A defense battalion is sent to Truk and guns installed on Truk's islands.

December A supply department is organized on Truk.

1941

January Aircraft from Truk attack airfields at Rabaul and Kavieng.

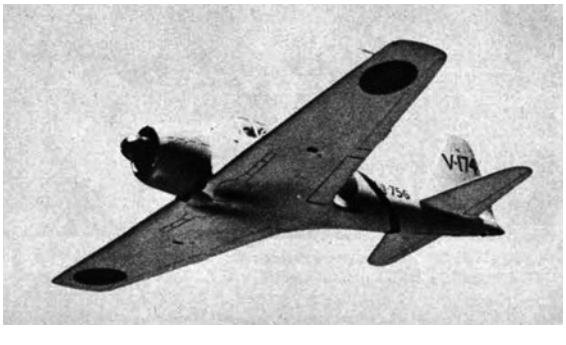
January 23 Japanese invade New Britain and New Ireland using forces sent from Truk.

November Six patrol craft assigned to Truk.

November Construction of Moen Airfields No 1 and No 2 begins.

December 902nd Naval Air Corps established at Truk.

December 7 Japan attacks the US fleet at Pearl Harbor, opening the Pacific War. It begins attacks in the Philippines and against British and Dutch possessions in the Far East.



The square-winged A6M3 was a mid-war upgrade of Japan's Type Zero fighter. Code-named Hap or Hamp, the Allies initially believed it was a completely new fighter. While an improvement over the A6M2, it was inferior to US Navy Hellcats or Corsairs. (AC)

The floatplane OS2U Kingfisher was intended for gunnery spotting and fleet reconnaissance when aircraft carriers were absent. Instead, by the time of the Truk raids, its primarily role was rescuing downed fliers, a role in which it excelled. (AC)

December 9 Japan occupies Tarawa and Makin in the British-held Gilbert Islands, using forces from Truk to assist.

1942

January Aircraft from Truk attack airfields at Rabaul and Kavieng.

January 23 Japanese invade New Britain and New Ireland using forces sent from Truk.

June 16 Sixth Submarine Fleet arrives at Truk.

July IJN Combined Fleet begins operating out of Truk.

July Work is started on 104th Naval Air Arsenal facilities.

November 104th Naval Air Arsenal becomes operational.

December Moen Airfield No 1 is completed.

1943

April Seaplane base at Moen Airfield No 2 is completed.

June Work starts on Param Field.

November 20 United States forces invade Tarawa and Makin in the Gilberts and capture both. Makin is secured by November 23; Tarawa by November 28.

December Eten Field is completed.

1944

January Work is completed on Param Field.

January First echelon of the 52nd Infantry Division arrives at Truk as Japanese garrison.

January 31 US forces invade and capture Majuro and Kwajalein in the Marshall Islands.

February 4 A US Marine Corps (USMC) PB4Y conducts a photographic reconnaissance flight over Truk.

February 10 Imperial Japanese Navy Combined Fleet abandons Truk. Naval activity at Truk sharply reduced as remaining ships prepare to leave.

February 17–18 Operation *Hailstone*: Task Force 58 launches two days of US carrier aircraft attacks on Truk.

February 18 US forces land on Eniwetok in the Marshalls.

February 19 Admiral Hara Chuichi placed in command of Japanese Fourth Fleet, headquartered at Truk.

March Fighter strip at Moen Airfield No 2 is completed but abandoned.

March Japanese Sixth Submarine Fleet moves to Saipan, and Seventh Submarine Fleet transfers to Truk from Rabaul.

March 12 The US Joint Chiefs of Staff decide to bypass Truk, canceling invasion plans in favor of landings in the Marianas.

March 15 US Army Air Force conducts first bombing mission against Truk with B-24s from Kwajalein.

April 30–May 1 Task Force 58 launches a second round of carrier attacks on Truk.

May 2 Eten Field is abandoned

June 15 Saipan, in the Marianas, is invaded by US forces, further isolating Truk.

July Param Airfield is abandoned.

August With the fall of the Marianas, Japan's Southeast Area Naval Air Arsenal Headquarters transfers from Saipan to Truk.

August 15 US Eleventh Air Force ceases flying missions against Truk.

September Seventh Submarine Fleet is dissolved.

October 27 Fourteen B-29 Superfortresses from the Marianas fly the first combat mission of the Twentieth Air Force, bombing the submarine base at Dublon.

November 11 B-29s from Saipan launch their final practice mission against Truk prior to beginning operations in Japan.

1945

January P-47N fighter squadron arrives at Saipan and begins operations, including against Truk.

June 14–15 British Task Group 111.2 launch carrier strike against Japanese installations at Truk.

June 15 British Task Group 111.2 bombards Truk with cruisers.

September 2 Japanese surrender Truk in a ceremony held aboard the heavy cruiser *Portland*.

1947

July 18 United Nations establishes the Trust Territory of the Pacific Islands, which includes Truk (or Chuuk), and assigns the United States administration of it.

1979

May 10 Chuuk joins with Yap, Pohnepei, and Kosrae to form the Federated States of Micronesia under US administration.

1986

November 3 United States terminates administration of the Federated States of Micronesia.

ATTACKER'S CAPABILITIES

Long-range air power in 1944

The B-24 Liberator combined long range, a heavy bombload, and reliability. It was the premier heavy bomber in the Pacific theater until the B-29's arrival. It was used by Army Air Force, US Navy, and US Marine air units. (AC)

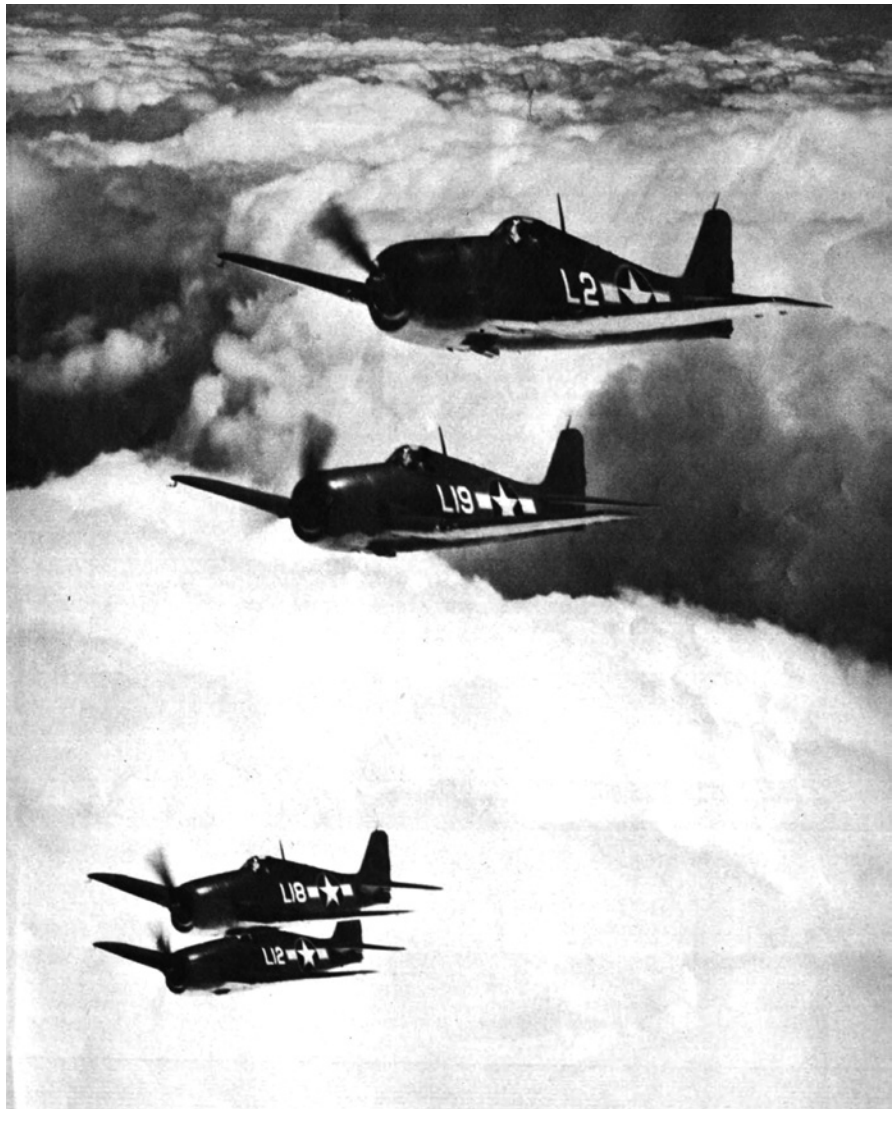
As 1944 began, Truk's location meant it had to captured or neutralized for the US to reach Japan. Truk's natural defenses prevented its capture except at an exorbitant price in blood, materiel, and time. Neutralization required projecting air power vast distances. In December 1943, the nearest Allied airfield was on Bougainville, over 800nmi away. Eniwetok, captured in February 1944, was 680nmi distant.

The United States was finally in a position to project sufficient power to neutralize Truk as 1944 opened. The US Navy began 1944 with six fleet aircraft carriers in the Pacific, each capable of operating up to 85 aircraft, and four light carriers, capable of carrying 35 aircraft apiece. By June 1944, they had seven of each, with two more fleet carriers under repair. This air armada was one and one-third to twice as large as that the Japanese employed on their Pearl Harbor attack. Furthermore, US carriers could hit harder and take more punishment than they did during the war's first two years thanks to improved damage control and tactical doctrine.

The aircraft operating off these carriers were capable and deadly. The fighters and torpedo bombers were second-generation aircraft, fielded since the opening of the war. The fighters incorporated lessons from the war's first year in their design. The US Navy's dive bomber, the venerable Dauntless, was being replaced by the larger and faster Helldiver. Yet in all three categories, even including the Dauntless, Navy aircraft were superior to and outperformed their Japanese counterparts.

The US could bring more than carrier aircraft against Truk. Four-engined bombers, initially B-24s, could reach Truk from Eniwetok, or even Kwajalein or Torokina on Bougainville, if reduced bomb loads were accepted. Eniwetok could be used as a refueling stop for aircraft from more distant bases, allowing greater numbers of bombers to attack Truk. Land-based bombers could concentrate on Truk's shore installations; perfect and stationary targets for high-level precision bombing. By 1944, the US Army Air Force had many B-24s, and their numbers were growing.

Aircraft carriers and surface ships required bombs, black oil, and beans to run. Their operations were limited by their fleet train. Air Force bombers required improved airfields



The Grumman F6F Hellcat entered service in 1943 and served as the US Navy's primary carrier-borne fighter aircraft through to the end of the war. It had been designed to defeat Japanese fighters, a task at which it excelled. (AC)

to operate. Both port and airfield facilities had to be built and every piece of ordnance, every bit of supplies and food, every gallon of aviation fuel, and every barrel of fuel oil had to be moved from America's Pacific Coast. A complex and intricate logistics system was as much a condition of victory as the combat forces attacking Truk.

Aircraft

The aircraft the Allies used to reduce Truk fell into two broad categories: US Navy and Royal Navy carrier aircraft, and land-based US Army Air Force aircraft. Carrier aircraft were all single-engine planes; land-based aircraft primarily four-engine bombers. Major carrier aircraft used included the F6F, F4U, SBD, SB2C, TBF/TBM, Seafire, and Firefly. The Army Air Force contribution came from the B-24 Liberator and B-29 Superfortress, although aircraft such as the twin-engine B-25 Mitchell and P-38 Lightning, and the long-range single-engine P-47N Thunderbolt, had minor roles against Truk. The Vought OS2U Kingfisher, a catapult-launched floatplane, played an important air-sea rescue role during the carrier raids.

Grumman F6F Hellcat: Appearing in late 1943, the Hellcat was designed to fight the Japanese Zero. It was the Allied fighter most feared by Japanese pilots. By 1944, it was the US Navy's primary carrier-based fighter, and remained so through 1945. The Hellcat was armed with six .50cal machine guns. It had a maximum speed of 391mph, a cruising speed of 200mph, a service ceiling of 37,300ft, and a range of 1,500 miles. Hellcats involved in the Truk campaign operated exclusively off US aircraft carriers. Each fleet carrier had one Hellcat squadron of between 32 and 38 fighters. Each light carrier held one squadron of Hellcats with 22–24 aircraft.

Vought F4U Corsair: The Corsair was a single-engine fighter, armed with six .50cal machine guns. It had a top speed of 417mph, a cruise speed of 220mph, a service ceiling of 36,000ft, and a 1,000nmi range. Although designed as a carrier aircraft, it proved difficult to land on aircraft carriers. A radar-equipped night fighter Corsair was used aboard carriers in limited numbers against Truk. During both carrier raids, approximately two four-aircraft flights of night-equipped Corsairs were used for fleet air defense during nighttime hours.

Douglas SBD Dauntless and Curtis SB2C Helldiver: These two single-engine dive bombers were used aboard Navy aircraft carriers during the campaign. The Dauntless carried up to 2,250lb of bombs, had a maximum speed of 255mph, a cruise speed of 185mph, a service ceiling of 25,500ft, and a 1,100nmi range. The Helldiver, a newer and more powerful aircraft, albeit experiencing development problems in early 1944, carried up to 2,500lb of bombs, had a maximum speed of 295mph, a cruise speed of 158mph, a ceiling of 29,000ft, and a 1,165nm range. Only fleet carriers carried dive bomber squadrons. Each fleet carrier had one squadron with 32–36 aircraft. Helldivers were replacing Dauntlesses. During the February raids on Truk, one fleet carrier operated Helldivers, while the rest had Dauntlesses; by the April raid, two carriers had Dauntless squadrons, the rest flying Helldivers.

Grumman TBF/General Motors TBM Avenger: The Avenger was a single-engine torpedo bomber with a crew of three. It carried a single 18in aerial torpedo or 2,000lb of bombs, had a top speed of 275mph, a cruising speed of 145mph, a service ceiling of 30,000ft, and a 1,000nmi range. Designed and built by Grumman, it was built under license by General Motors. It was used by the US Navy and the Royal Navy against Truk. Aircraft from both manufacturers were used. It flew as a torpedo bomber, but also as a medium- or high-altitude level bomber when few ships worth torpedoes remained at Truk. US fleet carriers carried one squadron of Avengers with between 14 and 20 aircraft. Light carriers held one squadron with eight or nine Avengers. HMS *Implacable* carried 21 Avengers in one squadron in 1945.

Supermarine Seafire: The Seafire was a single-seat fighter used by the Royal Navy, a maritime version of the Spitfire fighter. It had a top speed of 359mph, a cruising speed of 272mph, a service ceiling of 36,000ft, and a 400nmi range. Armed with two 20mm cannon and four .303 Browning machine guns, it could also carry eight 60lb rockets or 500lb of bombs. An outstanding air-superiority fighter, it had excellent performance at high altitude, but a short range. The Seafire was equipped with folding wings. Two squadrons with 48 Seafires were present when the Royal Navy raided Truk.

Fairey Firefly: The Fairey Firefly was a two-seat strike fighter and reconnaissance aircraft used by the British Fleet Air Arm. It had a top speed of 386mph, a cruising speed of 209mph, a service ceiling of 31,900ft, and a 660nmi range on internal fuel. It was armed with four 20mm cannon, and could carry eight or 16 66lb rockets or up to 2,000lb of bombs. The second crewman served as navigator and observer. Fireflies were used for anti-submarine patrols, fleet reconnaissance, and as ground-attack/anti-shipping aircraft. They were also used for fighter defense. HMS *Implacable* had one squadron of Fireflies with 11 aircraft.

Consolidated B-24 Liberator: Used by the Army Air Force during the reduction of Truk, the Liberator was a four-engine heavy bomber. It could carry up to 8,000lb of bombs

The Grumman TBF/TBM Avenger was the US Navy's primary torpedo aircraft. The US Navy's largest single-engine carrier aircraft in World War II, at Truk it was used (as shown here) as a torpedo bomber and a level bomber against both shipping and ground installations. (AC)

internally, but normally carried a 4,000–5,000lb bomb load on Truk missions. It had a maximum speed of 300mph, a formation cruising speed of 180–210mph, and a range of 3,000 miles. It could be used as a medium- or low-level bomber; against Truk, it was primarily used as a high-level bomber, typically operating at 18,000–25,000ft. It was also used for photo-reconnaissance by the Army Air Force, US Navy, and US Marine Corps. The Navy version, the PB4Y, was used for the first photo-reconnaissance missions over Truk. The Army Air Force's camera-equipped version was called the F-7A. The Seventh and Thirteenth Air Force flew most of the bombing missions against Truk. B-24 raids against Truk started in March 1944 and continued until May 1945. As few as two B-24s attacked Truk on night intruder missions, while as many as 40 Liberators made daylight raids. Typical daytime raids ranged from one to two dozen B-24s.

Boeing B-29 Superfortress: The B-29 Superfortress was another Army Air Force four-engine heavy bomber. It had a top speed of 357mph, cruised at 290mph, had a combat ceiling of 31,850ft, and a 2800nmi range. It could carry up to 22,000lb of bombs, and was armed with 12 .50cal machine guns and a 20mm cannon. Ten of the machine guns were in four remote-controlled turrets on the top and bottom of the fuselage. Two other .50cals and the cannon were in the manned tail turret. The fuselage

was pressurized and was equipped with radar and electronic countermeasures. Using B-29s against Truk was overkill, but the 30-odd missions that B-29s flew were useful training flights to introduce crews to combat before committing the aircraft to their primary mission of bombing Japan.

Vought OS2U Kingfisher: The Kingfisher, a catapult-launched floatplane, operated off US battleships and cruisers. It had a maximum speed of 171mph, a cruise speed of 152mph, a service ceiling of 18,000ft, and a 790nmi range. It had one forward-firing fixed .30cal machine gun and one flexible .30cal machine gun aft that the observer used. It could carry two 325lb depth charges. The Kingfisher was intended to provide reconnaissance, fire control, and observation for US Navy battleships and cruisers. Radar replaced its gunnery-spotting functions and carrier aircraft supplanted it for reconnaissance. It played a critical role during the Truk carrier raids by playing lifeguard, rescuing downed naval aviators.

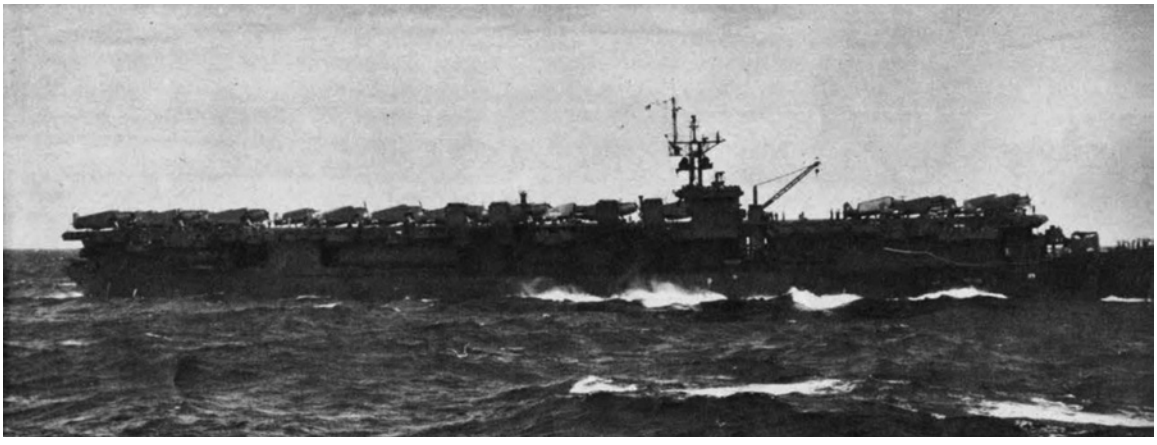
Facilities and infrastructure

Logistics and infrastructure drove the reduction of Truk. The Allies' biggest challenge was reaching Truk with enough force to neutralize Japan's air and naval garrison. Everything had to be moved across the Pacific Ocean from the United States. The closest port and naval repair facilities were 3,200 miles away at Pearl Harbor in the Hawaiian Islands or Australia, some 2,700 miles distant. There were no airfields within effective heavy bomber range of Truk when the campaign started. The nearest Allied airfields were Torokina and Piva on Bougainville. They had been completed in late December 1943, yet by February 1944 they were still crude facilities, better suited to light and medium bombers attacking Rabaul than heavy bombers in numbers large enough to reduce Truk.

US forces captured Majuro, Kwajalein, and Eniwetok in February 1944. Airfields were soon built on these atolls, but this required construction of runways, aircraft shelters, housing and office space for those operating or flying from the airfield, warehouses for supplies, magazines for ammunition and bombs, and fuel storage and distribution systems. Furthermore, since all of the materials to build an airfield came from overseas, a port had to be constructed first.

By early 1944, the United States had become extraordinarily adept at building port and airfield facilities. Airfields were operational at both Kwajalein and Eniwetok barely a month after the islands were captured. Work started on the airfield at Eniwetok on February 21,

The Essex-class aircraft carriers were 50 percent larger than the previous Yorktown-class carriers, and could hold an air group of up to 90 aircraft. With improved antiaircraft armament, damage control, and electronics, they provided the US Navy with a powerful punch. (AC)



In addition to the large Essex-class fleet carriers, the United States built nine Independence-class light carriers. Converted from Cleveland-class cruiser hulls, they held one-third the aircraft of the fleet carriers. Seven of the nine participated in the Truk raids. (AC)

1944. By March 11, a 7,000ft by 400ft runway, with taxiways and support facilities, was completed and aircraft could land there. It was operational in early April. Kwajalein's airfields opened earlier, but there engineers used existing Japanese fields as starting points.

The United States repeated this type of facilities creation magic throughout 1944, swiftly constructing anchorages, airfields, and bases whenever and wherever they captured islands. This not only improved the ability to attack Japan, but meant the Allies rarely needed existing Japanese bases. Heavily garrisoned Japanese strongpoints like Truk and Yap could thus be bypassed in favor of lightly held Eniwetok and Uluthi.

It would have been difficult reducing Truk using just long-distance heavy bombers, as Truk had a large fighter contingent in its air garrison. Islands within range of Truk in the spring of 1944 lacked the facilities to launch bomber formations of several hundred aircraft. Only smaller formations, featuring some 25–50 bombers, could attack Truk. Against minimal fighter opposition, these small bomber formations could make Truk's airfields and ground installations unusable. However, small groups of unescorted bombers would suffer unacceptable losses against massed fighter formations.

Truk's air garrison thus had to be reduced before heavy bombers could be effective. This reduction was best done with tactical aircraft, which could not reach Truk from the available airfields. To mass tactical aircraft, fighters and light bombers, against Truk, the US needed aircraft carriers, from which light aircraft could launch and land.

The aircraft carrier was born in World War I. Even with the primitive biplanes of that conflict, great things were expected from aircraft carriers. In 1918, Britain's Royal Navy planned a carrier strike to knock out Imperial Germany's High Seas Fleet. One hundred and twenty torpedo bombers, escorted by 20 fighters, were to attack the German fleet in port. However, the war ended before the planned raid was executed, although the Royal Navy delivered its promise against Italy's Regia Marina at Taranto in 1940. The Imperial Japanese Navy also did so against the US Navy at Pearl Harbor 13 months later.

The US Navy had eight aircraft carriers when it entered World War II. Three were in the Pacific; the rest, including a 20-knot escort carrier, were in the Atlantic. Over the next 14 months, the US lost four of its large carriers. By December 1942, it was forced to borrow the Royal Navy's HMS *Victorious*. But in 1943, a new generation of fast carriers, many of which had been started before the US entered the war, began arriving in the Pacific. These fast carriers were swift enough to launch hit-and-run strikes against Truk. By January 1944, the US Navy had nine such ships: five fleet carriers and four light carriers. Two more fleet carriers and three more light carriers were added by June that year.

Two types of US fleet carriers participated in the reduction of Truk. One was the *Enterprise*, the last remaining survivor of the three ships of the pre-war Yorktown-class. Designed in the early 1930s and completed between 1938 and 1941, the *Enterprise*, after a 1943 rebuild, had a full-load displacement of 32,000 tons. It had a waterline length of 770ft, an overall length (including flight deck) of 824ft, and could steam at up to 32.5 knots. It had a 12,500nmi range at 15 knots. It could carry up to 90 aircraft.

The other fleet carriers belonged to the Essex-class. Significantly larger than the preceding Enterprise-class, they had a full-load displacement of 36,400 tons. Their waterline length was 820ft, with an overall length of 872ft. With a top speed of 32.7 knots, they could steam a phenomenal 20,000nmi at 15 knots. They could carry up to 100 aircraft. The first carrier design after the expiration of naval limitation treaties, they were more heavily armored than the Enterprises and had superior damage control. They were built with radar and an integrated Combat Information Center (CIC) installed (systems that were retrofitted into earlier carriers). The first three of the class were ordered in 1940, with ten more ordered following passage of the Two-Ocean Navy Act of 1940. Another 19 were ordered after Pearl Harbor. Of the total of 32 ordered, just 24 were actually built, and only eight were in combat by June 1944.

The light carriers were built on cruiser hulls. After Pearl Harbor, nine Cleveland-class light cruisers under construction were converted to small aircraft carriers in an effort to quickly increase the fleet's carrier force. While less capable than Essex-class ships, they were available more quickly. They had a full load displacement of 15,100 tons, a waterline length of 600ft, an overall length of 622ft, a top speed of 31.5 knots, and relatively short range: just 8,325nmi at 15 knots. They typically carried 30 aircraft. All were in commission by the end of 1943, the first one seeing combat in November that year.

By 1944, the aircraft carriers were backed up by an armada of surface escorts, including six fast battleships, a dozen cruisers, and over two dozen destroyers. These provided antiaircraft and antisubmarine protection. They could produce massive antiaircraft fire: the battleships carried 20 5in guns, the cruisers between eight and 16, and the destroyers from four to six.

One US strength was the ability to quickly build airfields on conquered islands. The United States captured Kwajalein in February 1944; by April, it had established the airfield in this picture to launch attacks on Truk. (USAF)

OPPOSITE TORPEDO ATTACK

All the escorts carried numerous 40mm and 20mm guns for close-in protection of the carriers. They could keep up with the carriers, at top speed, except for three of the battleships, who could only manage 27.5 knots.

The carriers and their supporting ships were backed up by an enormous fleet train, meaning combat task forces needed to return to port only to rearm and repair. At the start of 1944, the US Navy could call upon a pool of over two dozen fleet oilers. These could keep up with the warships' cruising speed. The US Navy perfected underway refueling prior to World War II; by 1944, it was routine. Carrier task groups could leave an anchorage accompanied by oilers, approach a target, refuel outside the range of the enemy's aircraft, and make a high-speed run to the target, leaving the oilers behind. After the airstrikes ended, they rendezvoused with the oilers and refueled, ready to fight with renewed endurance.

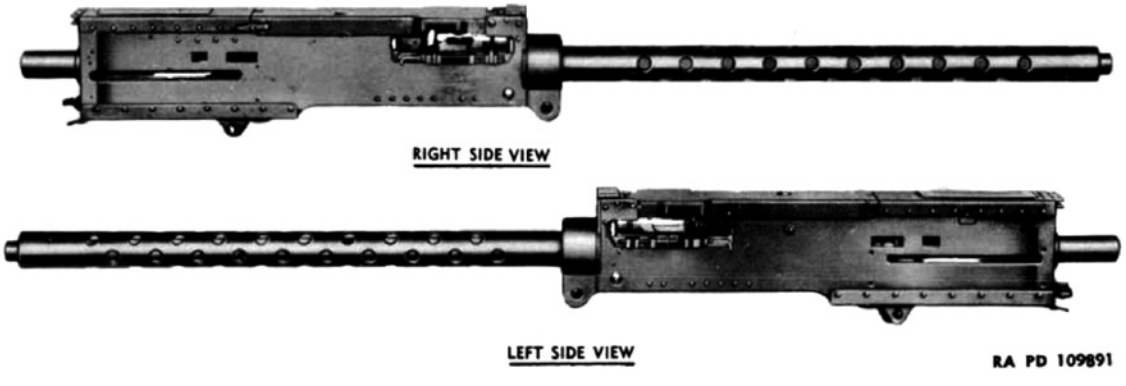
Weapons and tactics

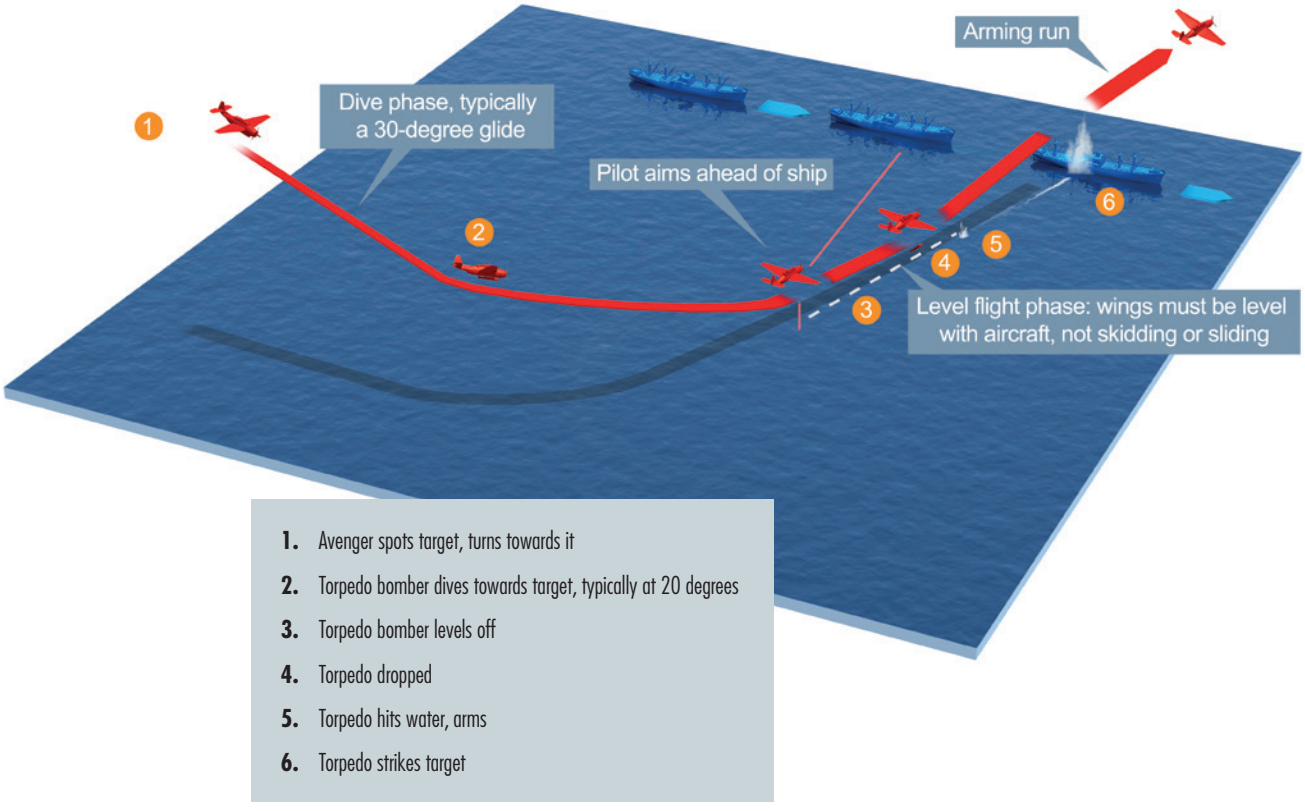
The weapons used against Truk were primarily those of Allied aircraft: .50cal and .30cal machine guns, aerial torpedoes, and general-purpose bombs. B-29s carried a single 20mm cannon in the tail turret, while the Helldiver had two forward-firing 20mm cannon in its wings. Fleet Air Arm aircraft attacking Truk in 1945 were armed with .303cal machine guns and 20mm cannon. Ship-mounted artillery provided antiaircraft protection for the task forces attacking Truk, especially during the 1944 raids. Ships' guns only occasionally bombarded Truk and sank Japanese ships.

US aircraft carried the M2 Browning .50cal machine gun, a larger and more powerful version of the .30cal M1919 Browning machine gun, which was also carried on US planes. Both were air-cooled and highly reliable. The US Navy and Air Force both used the M2 and M1919, with dedicated versions used in aircraft (the AN/M2 for the .50cal M2 and M2 AN for the .30cal M1919).

The main weapon used by US aircraft was the Browning AN-M2 .50cal machine gun. It fired a heavy slug capable of penetrating the deck plating of a Japanese destroyer, and could punch through Japanese aircraft. (AC)

The M2 had a muzzle velocity of 2,910fps (feet per second). It could fire 750–850 rounds per minute. The gun fired a 52g bullet, capable of penetrating 1in of armor, and could penetrate the structural steel of unarmored ships. It was potent against ships, ground vehicles, and buildings, as well as other aircraft. The M1919 was a lighter gun, with an 11g round and a muzzle-velocity of 2,800fps. Aircraft versions fired 1,200–1,500 rounds per minute. Its lighter hitting power meant it was effective primarily against aircraft or troops in the open.





1. Avenger spots target, turns towards it
2. Torpedo bomber dives towards target, typically at 20 degrees
3. Torpedo bomber levels off
4. Torpedo dropped
5. Torpedo hits water, arms
6. Torpedo strikes target

Forward-firing fixed AN/M2s were used by US fighter aircraft and Navy bombers. The Hellcat carried six wing-mounted AN/M2s, and the Corsair and P-47 had eight. AN/M2s were also used for the defensive armament of US Army Air Force bombers in power turrets and hand-held waist positions. The M1919 was primarily used in the flexible rear mounts of Navy single-engine bombers and in hand-held waist positions of patrol craft such as the PBY Catalina. The Kingfisher mounted a fixed, single, forward-firing .30cal gun fired by the pilot.

Only the US Navy used torpedoes at Truk. By the time the Royal Navy attacked in 1945, Truk held no targets suitable for aerial torpedoes. The torpedo used at Truk was the US Navy's Mark 13 aerial torpedo. The Mark 13 was developed in the 1930s and became operational in 1938. It was 13ft 9in long, with a 22⅖in diameter. By 1944, it had a 600lb warhead, and could travel 4,000 yards at 33.5 knots. Almost useless in 1942 due to serious reliability problems, by 1944 it had evolved into an effective weapon. Wartime modifications included adding a nose drag ring, tail shroud, and fin stabilizer. These slowed the torpedo enough that it no longer broke up or ran wild upon hitting the water.

While fragmentation, incendiary, and phosphorous bombs were used, the main weapon used against Truk was the high-explosive general purpose bomb. The most common ordnance dropped on Truk was the 500lb M-58 and M-58A1 semi-armor-piercing bomb. The M- 57 (250lb) and M65 (1,000lb) bombs were also used. With all of these bombs, roughly half the weight was the steel case, with the remaining weight made up of explosive, typically TNT. The 500lb bomb worked best. The frame and metal roof construction of buildings

on Truk proved extremely vulnerable to 500lb bombs. These bombs could fracture runways and concrete foundations. They were also effective against small warships, cargo ships, and harbor craft such as tugs and barges. Against larger warships, including light cruisers, 1,000lb bombs were more effective, but relatively few larger warships were at Truk in February 1944, and none thereafter.

While the Japanese at Truk were largely incapable of counterattacking island airfields used by Allied forces to attack them, they could potentially attack naval task groups hitting Truk. Consequently, antiaircraft defenses were an important part of any naval force.

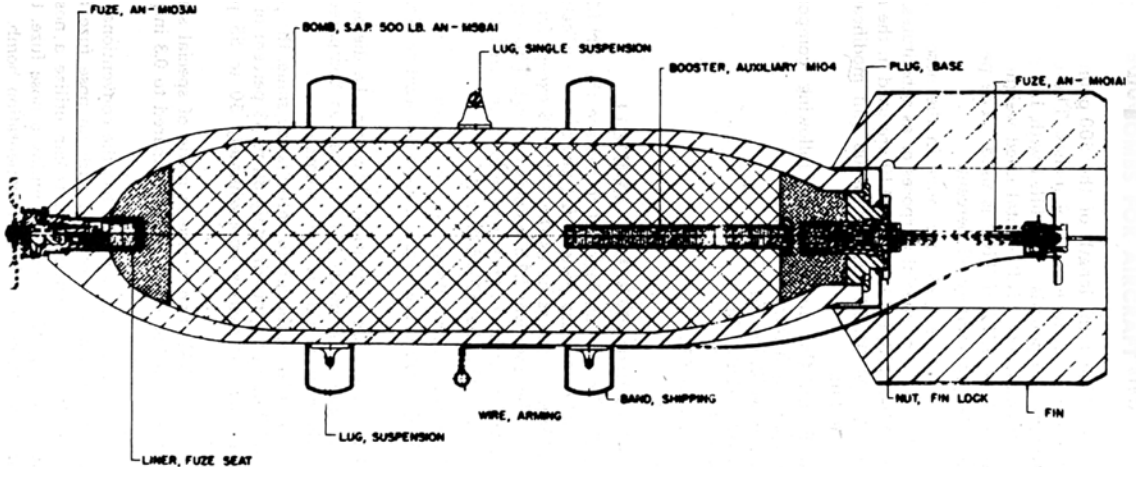
Antiaircraft defense started with radar, which was used for detecting enemy aircraft, vectoring Allied aircraft to intercept them, and fire-control once Japanese aircraft arrived within range of shipboard artillery. At the beginning of 1944, every major Allied warship had radar. Most had some version of SK air search radar, which had a range of 162nmi if the aircraft was in line of sight. Additionally, by 1944, destroyers and larger warships had fire-control radar to provide both the approach azimuth and altitude of incoming aircraft. This directed the fire of 5in/.38cal antiaircraft guns forming destroyers' main batteries and secondary batteries of cruisers, aircraft carriers, and battleships.

The 5in/.38cal gun was the finest dual-purpose naval gun of World War II, effective and deadly against aircraft, especially when accurate aircraft altitudes were provided for fusing. The shell weighed 55lb, of which 7–8½lb was the bursting charge. It could fire 15 rounds per minute, had a 37,200ft ceiling, and could reach low-flying aircraft up to 8½ miles away. These guns were backed up by an array of 40mm Bofors and 20mm Oerlikon antiaircraft guns also mounted on US warships.

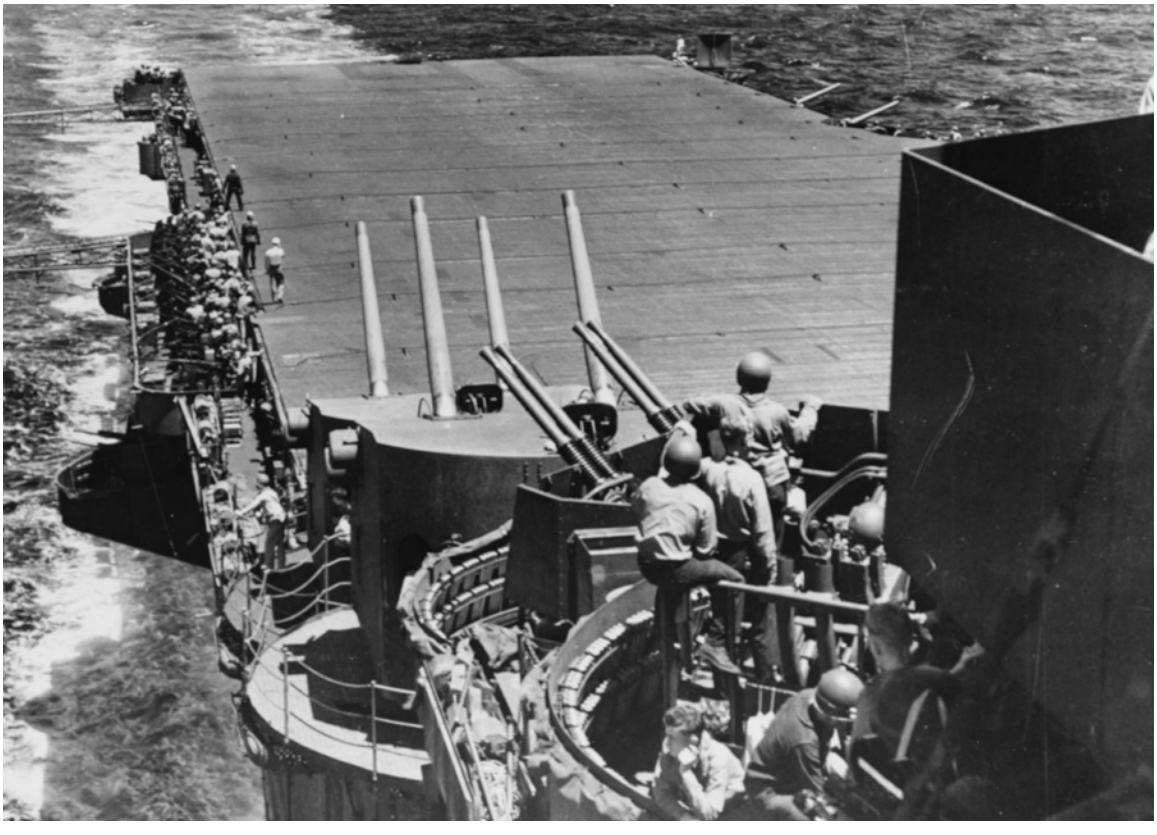
The 40mm Bofors was a Swedish design, built under license in the United States. It fired a 2lb explosive round, had a 120-round per minute rate of fire, and had a ceiling of 22,300ft. To minimize friendly fire potential, rounds were typically fused to explode after traveling 12,000–15,000ft, within which distance they were deadly.

The 20mm Oerlikon, a Swiss design produced under license, fired a projectile weighing 0.27lb. Its effective rate of fire was 250–320 rounds per minute and it had a 10,000ft ceiling, although it was rarely effective beyond 3,000ft. US Navy doctrine was to begin firing 20mm guns when the target was 3,900ft away, allowing aimed corrections as the target entered effective range.

Defense doctrine called for enemy air raids to be intercepted by fighters flying combat air patrol over the carrier force. These would be guided by the carrier, which sent intercept vectors based on radar observation of all aircraft, including the altitude of the approaching



A variety of ordnance was used against Truk, including incendiaries and fragmentation bombs. For the most part, the general-purpose, semi-armor-piercing bomb was used, most commonly in the 500lb size. A cutaway of this bomb is shown here. (AC)



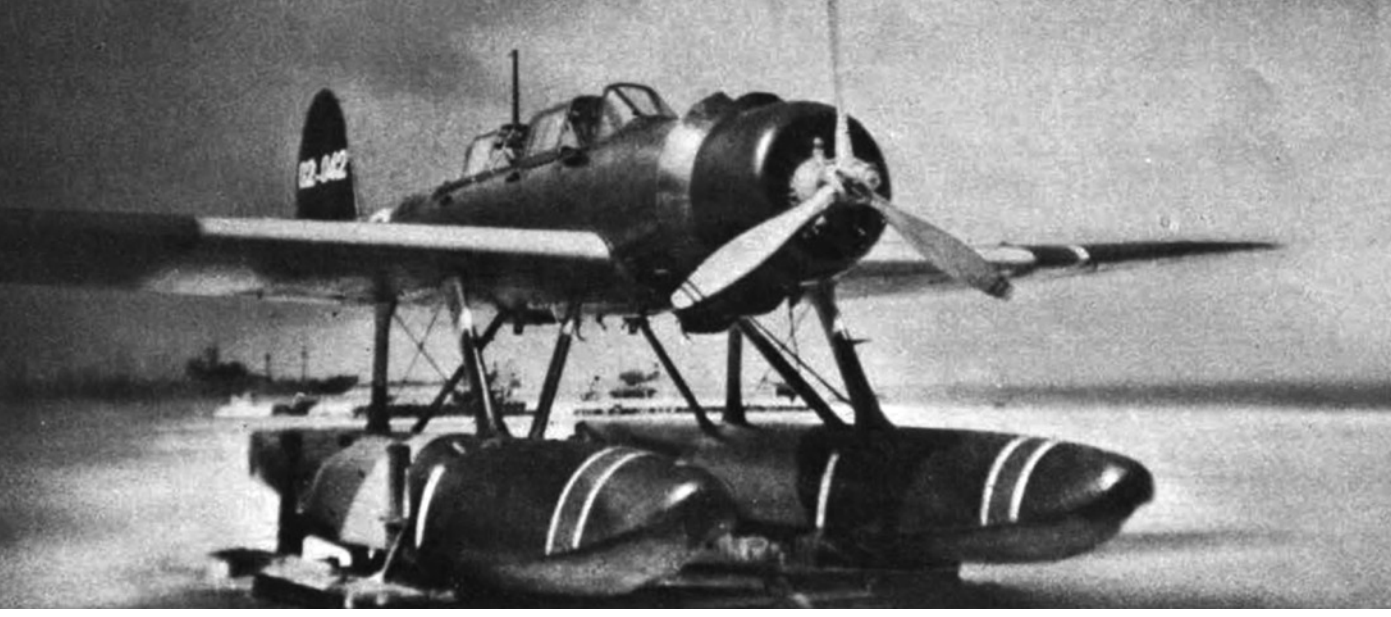
US Navy carriers contained a massive array of antiaircraft guns. In this picture, a medium-range quad 40mm is in the foreground, with long-range 5in/.38cals in twin turrets mounted astern. A gallery of short-range 20mm guns lines the side of the flight deck aft.

enemy. (US aircraft had IFF – Identification, Friend or Foe – transponders allowing separate tracking of enemy and friendly aircraft.)

The combat air patrol broke off when surviving attackers came within 5in antiaircraft gun range. Ships were arranged with carriers in the center, cruisers and battleships in an inner ring around the carriers, and destroyers forming an outer ring. This layered defense was difficult for small groups of aircraft to penetrate during daylight hours, but it was easier at night. Only the 5in guns were radar-controlled, and naval night fighter doctrine was in its infancy. The US Navy added radar-equipped night fighters in February 1944, but fleet carriers only carried four, if present at all.

US Navy offensive air doctrine relied on fighters as much as its bombers. The first day's attack at Truk was a massed fighter sweep. The sweep was intended to lure Japanese fighters into the air, where US fighters, more capable and with better-trained pilots, could shoot down the enemy. If the Japanese remained on the ground, the US fighters strafed their airfields, rendering the defenders incapable of launching aircraft. Once fighter sweeps achieved air superiority, Navy bombers attacked. They attacked shipping first, switching to airfields and shore installations after there was nothing more to sink.

Army Air Force attacks, especially those by B-24s, were flown in close formation, using the combat box formation developed over Germany. It allowed the B-24s to provide mutual protection and maximized the defensive machine guns brought to bear against attacking enemy fighters. Typically, disrupting bomber formations required massed fighter attacks in numbers unavailable to Truk's air garrison when Army Air Force raids began. Additionally, the US bombers typically attacked from high altitudes, rendering most antiaircraft artillery ineffective. The weather over Truk was usually favorable for precision daytime bombing.



DEFENDER'S CAPABILITIES

The 'Gibraltar of the Pacific'

The twin-float, single-engine Aichi E13A was one of a number of floatplanes operating out of Truk. Codenamed "Jake" by the Allies, it was primarily used for short-range reconnaissance and to provide air cover at Japanese naval outposts which lacked airfields. (AC)

Truk's main function as 1941 ended and the Pacific War began was as a naval anchorage. It was the Imperial Japanese Navy's biggest anchorage outside the Home Islands. The headquarters of Japan's Fourth Fleet from 1939 to the end of World War II, it was the Combined Fleet's home port from mid-1942 until February 1944. Between 1941 and 1943, Truk's importance as an airfield also grew, almost overshadowing its importance as an anchorage. Its airfields were important not only for defending the fleet anchorage, but as a training base and ferry point for naval aircraft moving between Japan and combat theaters.

Truk was neither well developed nor well defended prior to World War II. Although the United States feared the Japanese had been fortifying Truk for nearly two decades, in truth, Japan largely ignored Truk after capturing it in 1914. Fortifications were expensive; Japan could not afford both a large fleet and to extensively fortify its imperial possessions. The Navy preferred building a large fleet. When the Pacific War started on December 7, 1941, only a few coastal batteries and naval minefields added since November 1939 covered the passes into Truk Lagoon. Few other defenses protected what the Allies called "the Gibraltar of the Pacific." Additionally, through the war's first two years, Truk offered the Imperial Japanese Navy little more than a sheltered anchorage. Its logistical and repair capabilities were rudimentary.

Truk needed few artificial defenses to make it virtually impregnable to surface invasion. A triangular fringe of coral reef and islands roughly 35 miles across surrounded approximately 30 small mountainous islands. The largest interior islands were 4–5 miles across, leaving space for airfields and bases. While the coral islands were low-lying, the interior islands rose as much as 1,450ft above sea level. Truk was a naturally sheltered and easily defended anchorage, large enough to comfortably accommodate the entire Imperial Japanese Navy and out of range of enemy naval guns.

The only threat came from the air. Truk's bases were not fortified against air attack; their antiaircraft artillery was inadequate. Their defense depended on the air garrison, one of the

strongest in Japan's Southeast Pacific theater. The only question was whether it was large enough. Until January 1944, Truk was out of range of Allied long-range bombers, and Allied carrier fleets had been too small to challenge Truk. That all changed in 1944.

Aircraft

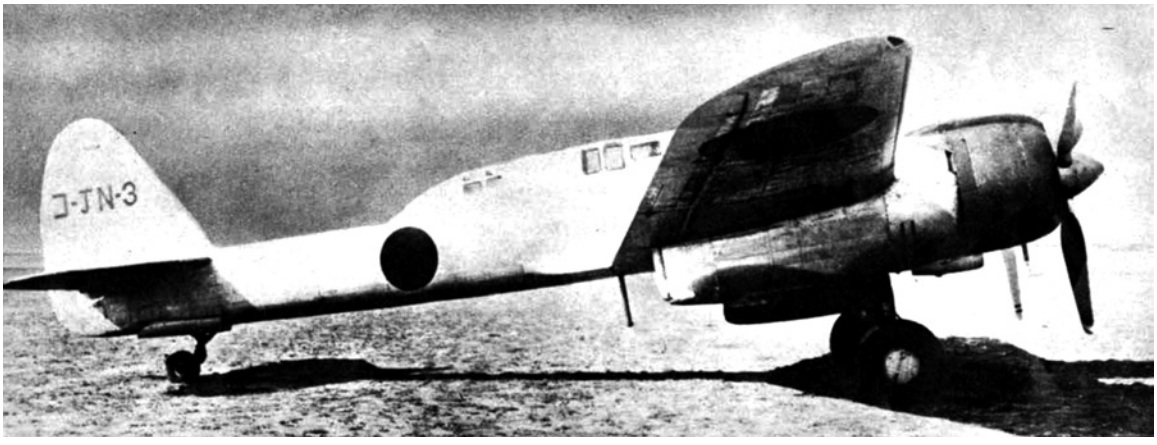
In February 1944, Truk's airfields were home to 365 aircraft. Of these, 41 were floatplanes or flying boats, 12 were twin-engine land-based bombers, and 72 were single-engine bombers. The rest were fighters. All aircraft were naval aircraft. The Imperial Japanese Army had no airfields or aircraft at Truk. The twin-engine bombers and the two four-engine flying boats were used for long-range reconnaissance, as well as bombers. The single-engine floatplanes were used mainly for short-range scouting, although some could double as fighters or bombers. The main types present were as follows:

The Mitsubishi A6M (Allied codename Zero, Zeke, Hamp, Rufe): The Zero dominated the Pacific in 1941 and 1942, so much so that the Imperial Japanese Navy delayed developing a replacement. By 1944, however, it was outclassed by new Allied fighters, especially the F6F Hellcat and F4U Corsair. Three types of Zeros were at Truk, the A6M2 and A6M5 (called Zeke by the Allies) and A6M3 (known as Hap or Hamp). All were armed with two 7.7mm machine guns and two 20mm cannon (Type 99-1 for the A6M2 and Type 99-2 for the A6M3 and A6M6). All had a service ceiling of 32,000ft and a top speed of 332mph. The A6M2 had a range of 1,600 miles; the A6M3 and A6M5 had a shorter range, but were capable of ferrying from Truk to outlying islands, and of providing airfield defense. The A6M3 had the more powerful cannon and better protection, but pilots preferred the older A6M2 due to its greater maneuverability. There were at least 200 A6Ms stationed at Truk in February 1944.

There were also up to a dozen Nakajima A6M2-Ns at Truk, stationed at Dublon. This was a floatplane version of the A6M, built under license from Mitsubishi. It had a top speed of 270mph, a cruising speed of 184mph, service ceiling of 33,000ft, and range of 620nmi. It was codenamed Rufe by the Allies.

Nakajima J1N1 Gekko (Moonlight – Allied codename Irving): A twin-engine night fighter, the Gekko was designed in the late 1930s as a long-range escort fighter, entering service in early 1942. It had a top speed of 315mph and a service ceiling of 30,000ft. Heavily armed, the Gekko carried a mix of up to four upward- or downward-firing 20mm cannon. Too slow to be effective daytime fighters, Gekkos were converted to night fighters once airborne radar sets became available. However, no radar units were available at Truk, so the Gekkos there operated without them. They were mainly used against nighttime B-24 raids. There were ten Gekkos at Truk in February 1944, and they avoided taking losses during the

A late-war A6M5 version Zero, known to the Allies as the Model 52. Introduced in 1943 and present at Truk, it may have been the most effective Zero. It was still inferior to the fighters used by the US Navy in 1944. (AC)



The Nakajima J1N1 Gekko was the Japanese Navy's primary night fighter. Up to a dozen Gekkos were present at Truk, but their night-fighting effectiveness was limited because they lacked radar. (AC)

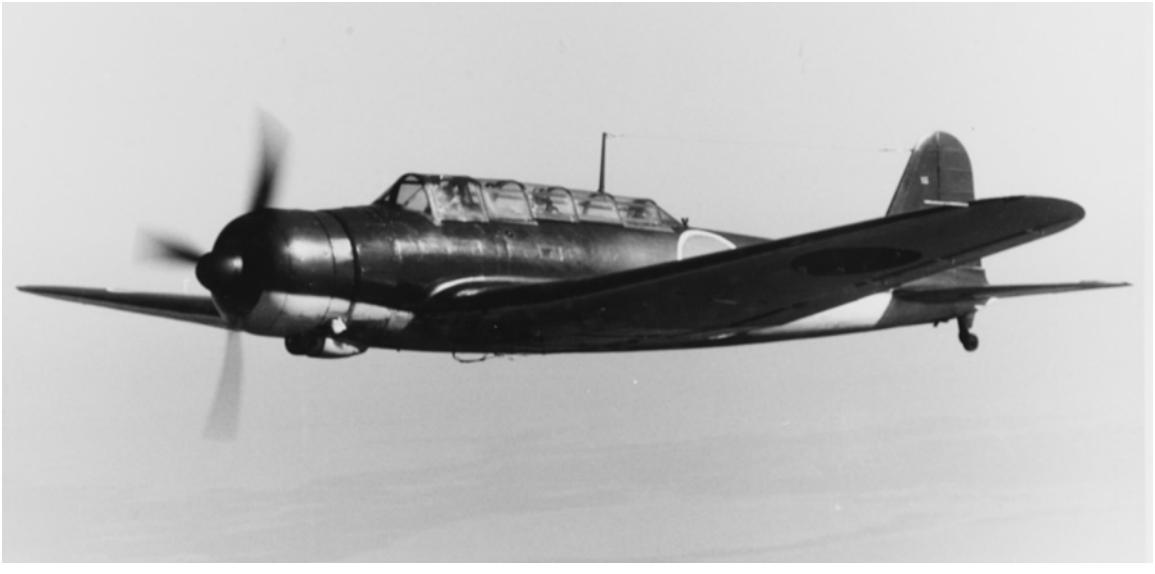
first carrier airstrike on Truk. Small numbers and a lack of radar meant they contributed relatively little to Truk's defense.

Nakajima B5N (Allied codename Kate) and Nakajima B6N Tenzan (Heavenly Mountain, Allied codename Jill): The B5N was the Imperial Japanese Navy standard carrier-based torpedo bomber at the start of World War II. The B6N was its replacement. Both carried one 800kg (1,760lb) aerial torpedo, or up to 800kg in bombs. The B5N had a maximum speed of 235mph, a cruising speed of 161mph, a ceiling of 27,000ft, and a range of 1,200 miles. The B6N, with a more powerful engine, had a maximum speed of 300mph, a ceiling of 29,660ft, and combat range of 934nmi. During Truk's siege, these aircraft were the primary threat to US Navy carriers attacking Truk. Japanese aerial torpedoes were deadly. There were 60 torpedo bombers stationed at Truk in February 1944, most of them Kates.

Yokosuka D4Y1 (Allied codename Judy): The D4Y1 was intended as a dive bomber, a replacement for the Aichi D3A, but proved to have structural problems. Unable to serve as a dive bomber, it was instead used for reconnaissance and as a level bomber. It was fast (with a 342mph maximum speed), had a range of 910 miles, and a 35,000ft service ceiling. Armed with two forward-firing 7.7mm machine guns and one rearward-firing flexible 7.7mm machine gun, it could also carry 1,000lb of bombs. One of the few Japanese aircraft with an in-line liquid-cooled engine, it was often mistaken for the Kawasaki Ki-61 (Tony), an Army fighter. D4Y1s were sometimes used for air defense at Truk. Armed with small, time-fused bombs intended to explode in mid-air, it flew over Allied bomber formations, dropping air-to-air bombs in the hope of breaking up formations. Twelve D4Y1s were at Truk in February 1944, while another 48 controlled by Truk were stationed at other Central Pacific bases.

Mitsubishi G4M (Allied codename Betty): This twin-engine aircraft was developed as a long-range bomber for the Imperial Japanese Navy. These land-based attack bombers (*rikko*) were intended to offset Japanese naval treaty tonnage limitations by substituting aircraft for warships. They were effective ship killers early in the war. The G4M carried one aerial torpedo or up to 800kg (1,766lb) of bombs, had a top speed of 365mph, a cruising speed of 196mph, and a range of 1,770 miles. There were 12 G4Ms at Truk at the beginning of February 1944, yet many were destroyed on the ground at the outset of the campaign and they played only a minor role thereafter.

Mitsubishi F1M (Allied codename Pete) and Aichi E13A (Allied codename Jake): These were single-engine floatplanes used for reconnaissance. The F1M was a biplane, the last biplane in Imperial Japanese Navy service. It had a single float, a two-man crew (pilot and gunner), a top speed of 230mph, a service ceiling of 31,000ft, and a range of 400nmi. It was armed with two fixed, forward-firing 7.7mm machine guns and a flexible, rear-firing 7.7mm machine gun. It could carry two 60kg (132lb) bombs. The monoplane E13A had



The Nakajima B5N was Japan's primary carrier-borne torpedo bomber in 1941. By 1944, it was being superseded by the B6N. Both were present at Truk. The B5N was the only Japanese aircraft type at Truk to successfully damage a US Navy warship during the campaign. (AC)

twin floats and a three-man crew. It had a maximum speed of 234mph, a cruising speed of 138mph, a service ceiling of 28,600ft, and a 1,130nmi range. It had a backward-firing flexible 7.7mm machine gun. Some E13As were equipped with two fixed 20mm cannon installed slanting downward, which were used to strafe ships or provide ground support. The E13A could also carry one 250kg (551lb) bomb.

Both planes were used primarily for reconnaissance. They were launched by catapult from battleships and cruisers. F1Ms were assigned to battleships and aircraft carriers, and were the IJN's only short-range reconnaissance production aircraft. The long-range E13A was used on cruisers. Both saw extensive use from seaplane bases to provide air support, reconnaissance, and antisubmarine convoying where airfields were unavailable. Both could be pressed into service as a dive bomber and the F1M as a fighter when more capable aircraft were unavailable. There were 32 F1Ms and E13As at Truk in February 1944.

Kawanishi H6K (Allied codename Mavis) and Kawanishi H8K (Allied codename Emily): Four-engine flying boats, the H6K along with the H8K were used for long-range reconnaissance. The H8K had a maximum speed of 210mph and cruised at 138mph. Its operational ceiling was 25,000ft and it had a range of 2500nmi. It had a crew of eight. It carried single 7.7mm machine guns in open bow and dorsal mounts and beam blisters, and a 20mm cannon in a tail turret. It could carry two 800kg (1,760lb) aerial torpedoes, or up to 1,000kg in bombs. There were two H6Ks at Truk in February 1944, which provided air search duties during the Truk campaign.

Facilities and infrastructure

Truk Atoll was a coral atoll surrounding a drowned mountain. Despite Truk's reputation among the Allies as the "Gibraltar of the Pacific," it was indifferently fortified. Prior to 1939, it had only minimum facilities, merely those appropriate for the capital of a mandate territory. Dublon Town, Truk's largest town, on the island of Dublon, served as the administrative center for Japan's Caroline Island Mandate. It had no more than 1,200 buildings when the war started. Japan built facilities on eight islands. In addition to Dublon, installations were built on Moen, Fefan, Uman, Eten, Param, Ulalu, and Udot. In addition to serving as the administrative center for the Carolines Mandate, Dublon contained docks with port facilities and a seaplane base capable of housing up to 50 aircraft. These all existed prior to 1939.

North Pass
PACIFIC OCEAN
Northeast Pass
Truk Lagoon
Moen #1
Moen
TRUK ATOLL
Ulalu
Moen #2
Tol
Udot
Dublon
Param
Fefan
Eten
Piaanu Pass
Uman
Uligar Pass
South Pass
Ota Pass
KUOP ISLANDS
Airfields
Seaplane bases
Radar stations
Port facilities
Administrative center
Torpedo boat bases
Supply depot
Radio Direction Finding (RDF) station
N
0
5 miles
0
5km

OPPOSITE TRUK ATOLL

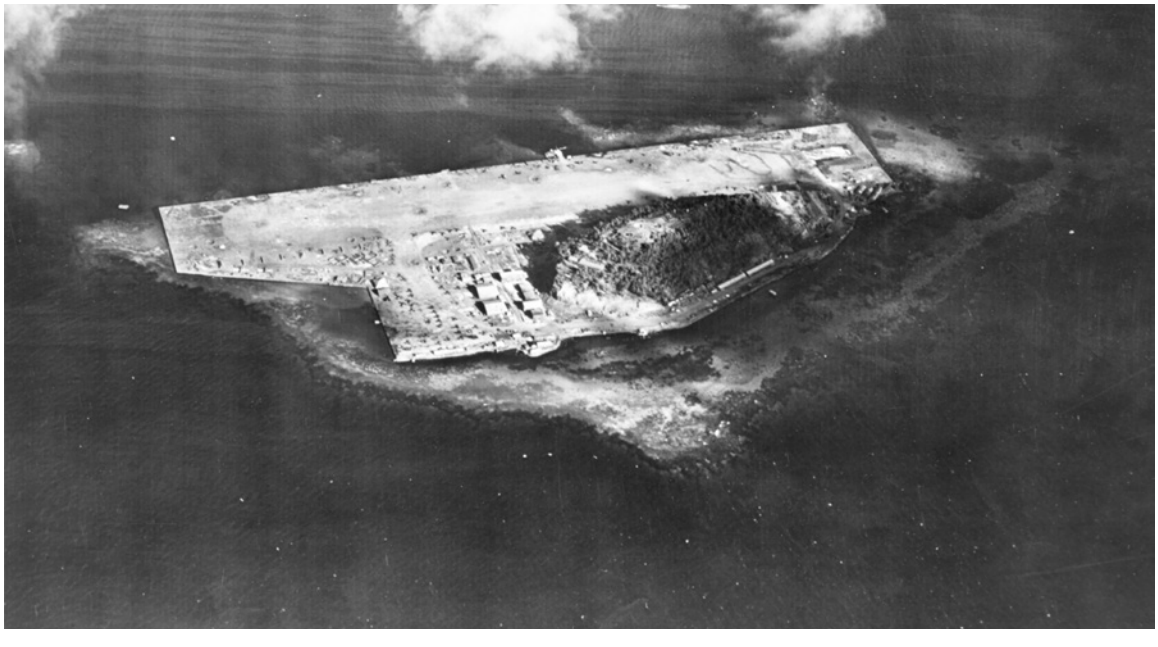
None of its piers were large enough to accommodate large ships, nor were there enough cranes to handle large quantities of stores. Consequently, cargoes had to be transferred between ship and shore aboard barges and sampans.

Fuel facilities were equally limited. The port had six fuel storage tanks with a capacity of 49,000 tons. A single pier was equipped to handle fuel; it could only accommodate fuel barges, of which Truk had just three: one held 500 tons of fuel, a second could transfer 200 tons, and the third 50 tons. Frequent resupply from tankers was necessary and the process of fueling ships and refilling the storage tanks slowed because fuel had to be lightered between ship and shore using fuel barges.

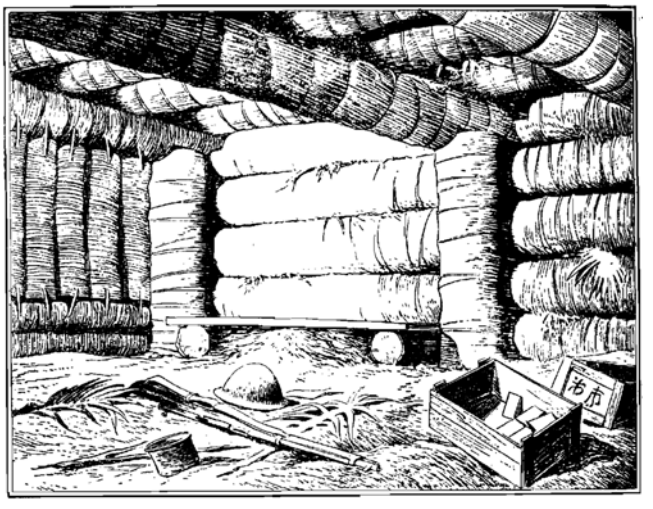
A Japanese battleship carried 4,500 tons of fuel, a cruiser 2,000 tons, and a destroyer 400 tons. Shore facilities barely stored enough oil to refuel the Combined Fleet once. Often, it was easier to refuel directly from fleet oilers; a straightforward task in the lagoon's sheltered waters.

After 1939, when Truk's facilities were expanded, Dublon's port facilities grew. By January 1944, they included naval headquarters buildings, a submarine base, a torpedo storage and maintenance facility, a supply facility (including ammunition storage bunkers), repair shops, and a 1000kw generator. Yet shore facilities remained rudimentary. Dublon possessed only 70 small repair shops, the marine railroad could only handle vessels up to 35 tons, and the port's two torpedo-servicing shops could only perform basic maintenance on the torpedoes and were capable of servicing only 22 torpedoes a week. For protection against air attacks, submarines were expected to lie on the bottom of the lagoon. There were no submarine shelters. Shore facilities for submarine crews extended only as far as a rest camp to be used between missions.

Shore installations were augmented by floating facilities. There was a 2,500-ton floating dry dock, sent from Japan in 1941. The submarine base included up to three submarine tenders. Repair ships and a crane ship were stationed at Dublon until the base was abandoned



Japan converted virtually the entire island of Eten into a large, immobile aircraft carrier. It was the primary airfield used for ferrying aircraft between Truk and Japan's outlying bases. (USNHHC)



After the February air raids, the Truk garrison began moving their facilities, including aircraft hangars, underground. Lacking concrete and structural steel, these facilities were improvised from trees native to the islands and mounded dirt. Their interiors looked much like this. (AC)

in February 1944. Even with these, Truk's repair capabilities were limited. Shore installations could repair up to seven ships at a time: two destroyer-sized ships (up to 2,000 tons) and a maximum of five 600-ton ships. The repair vessels were incapable of conducting major repairs on large warships; they could only patch them up well enough to reach Japan.

Naval facilities on other islands were added only after 1941. These included a supply center on Fefan and torpedo boat bases on Moen, Uman, and Tol. The supply center also had a pier, but as with Dublon, required lighters to carry materiel between ship and shore. It also contained warehouses for supplies and ammunition dumps for munitions. Long-distance warning radars were installed on Moen, Fefan, and Tol, and there was a radio direction finding station on Ulalu.

Japan built four airfields on various Truk islands between November 1941 and February 1944, all run by the Imperial Japanese Navy. This included an airfield and a combined seaplane base and airstrip on Moen, and airfields on Eten and Param. Moen No 1 had a 1,200m-long runway. It was located on Moen's northwest tip, and primarily used for bombers. Moen No 2 was 1,000m long and located on the southern end of the island. Land-based fighters were located there, along with floatplanes at the attached seaplane base. Eten, which had a 1,000m by 85m airstrip and facilities to handle over 200 aircraft, was primarily a fighter field.

Bombers operated out of Param. Param originally had a 1,200m by 100m runway, which was expanded to 1,430m in 1944. Additionally, the seaplane base at Dublon was expanded, with an airstrip added by extending the apron. This was not completed, and may have been intended as an emergency strip. The Japanese also began work clearing a runway on Mesagon, a coral island on Truk's outer atoll, but abandoned it as unnecessary.

The airfields had extensive maintenance facilities. Eten field included revetments, plus aircraft repair and maintenance shops. Dublon was a major maintenance installation for seaplanes. Truk was home to the 104th Air Arsenal, an aircraft assembly and repair organization which provided logistics support for most of Japan's Southeast Pacific theater. One of Truk's major roles was as a transit point for aircraft moving to Japanese possessions in the Solomons, the Bismarck Archipelago, the Gilberts, the Marshalls, and the rest of the Carolines. Aircraft came to Truk crated in transports or aboard auxiliary aircraft carriers used as ferries. From there they would be assembled, serviced, and sent to their final destinations.

Truk's army garrison was small through the war's first three years. Significant numbers of troops were brought in only in January 1944, when the 52nd Division began arriving. Army garrisons were initially placed on Dublon, Moen, Fefan, Uman, and Tol. Troop strength thus soared; from a few hundred manning coastal batteries to 7,500 by the end of February 1944. By the end of April, with the arrival of the final elements of the 52nd Division and garrisons withdrawn from other islands in the Carolines moved to Truk, a troop strength of 14,200 men was achieved. These were infantry, with divisional artillery and antiaircraft, but no armor.

Fortifications were nonexistent in February 1944. All facilities were above ground, unprotected, and not camouflaged – both Army and Navy – until after the Operation *Hailstone* carrier attacks on February 17 and 18. The Army lacked barracks. Troops were housed in school buildings and civilian houses. After the carrier attacks, the Japanese began

moving facilities underground. Eventually, by the end of 1944, everything had moved underground, with extensive fortifications built on Truk's inner islands and coral islands guarding the four passes into Truk Lagoon. Everything was built using local materials, earth, and timber. Concrete and structural steel had to come from Japan; none had been for the Army's use prior to 1944.

That was Truk's ultimate weakness; everything had to come from Japan. Japan's sealift capacity was limited. From 1941 through to the end of 1943, Truk had a lower priority than bases further out. It got what was required for immediate needs, but was unable to stockpile surpluses. Even if it could have done so, limited fuel storage and warehouse capacities hampered stockpiling. As 1943 ended, the US submarine campaign began sinking ships carrying cargoes to Truk. After the Marianas fell in June 1944, goods could only arrive by passing through the Palau Islands. After Peleliu was captured in September that year, only submarines could reach Truk.

Weapons and tactics

The Japanese defense of Truk was handicapped in two ways. It lacked a coherent defensive doctrine and the defensive resources it had were primarily intended to protect Truk from a threat that never materialized: an amphibious invasion. Truk lacked sufficient weapons to fight the campaign the Allies conducted: neutralization and isolation through air power. It had insufficient fighter aircraft and antiaircraft artillery, and lacked an integrated air defense system.

Japan's military doctrine emphasized the offensive. The Navy's ships and aircraft were seen as instruments of attack. Its aircraft were built to maximize range, maneuverability, and bombload: hit your enemy first and hard enough, and he could not hit back. Resources spent on defense were seen as misallocated. Yet, as the Allies proved, the weakness of this doctrine was that if that first hit did not knock out an enemy, it left the attacker vulnerable to devastating ripostes.

The first-generation Allied aircraft of the Pacific War proved less maneuverable than Japanese aircraft, but were rugged enough to survive long enough to counterattack. This often proved fatal to Japanese air attacks. A single Wildcat was able to break up an attack by nine G4M bombers on the carrier *Lexington* in 1942, shooting down five. By 1944, a new generation of better Allied aircraft was in the field, while Japan was still fielding the aircraft with which it had started the war. Now-inferior Japanese aircraft performance made it more difficult to hit first – and hard to keep from getting hit.

Truk had 365 aircraft in February 1944, when the United States opened its campaign to neutralize Truk, and would receive nearly 150 more between February and June. For Japan, this was an enormous commitment of resources. The Pearl Harbor attack force had 420 aircraft embarked, the largest carrier task force assembled to that date. Yet only 200 of the aircraft present in February were fighters. Moreover, the fighter aircraft were primarily some variant of the Mitsubishi Zero, an aircraft past its prime by 1944. The air garrison was also outnumbered by US air groups in both carrier strikes against Truk: Task Force 38 threw 470 aircraft against Truk in February and nearly 600 in April.

Nor were Truk's fighters well-positioned to deal with Army Air Force heavy bombers that began attacking Truk in March 1944. Both the B-24s and B-29s routinely flew between 20,000ft and

Japan had a wide array of antiaircraft guns at Truk, including large twin-mount 127mm guns. These were as effective as the US Navy's 5in/.38cal guns. Truk was handicapped because it lacked sufficient numbers of guns and the defenders had to ration ammunition. (AC)

The Truk garrison was also equipped with a number of 25mm guns, typically in twin mounts similar to this one. There were never enough, and they lacked the ability to damage bombers flying above 10,000ft. (AC)

30,000ft when bombing Truk. While both the A6M Zero and J1N1 Gekko could reach those altitudes, their performance fell off dramatically above 20,000ft. Additionally, Japan had little protection against night raids. The A6M was a day fighter, and Truk never had more than a dozen J1N1 night fighters; these aircraft lacked radar, which meant they depended on visual observation aided by searchlights to make contact with attacking formations.

The airfields were vulnerable to air raids, as were shore-based facilities. They were all above ground and unprotected. Truk's security lay in its geographic isolation rather than its fortifications; it lacked adequate antiaircraft artillery. It had only 40 large antiaircraft guns, those between 75mm and 127mm, and probably 80–120 light antiaircraft guns of 25mm and less. The guns were distributed to protect five airfields, three port facilities, several warehouses, and the administrative center at Dublon. This meant each battery was small – just four to six heavy and light antiaircraft guns at each installation. Although some installations were close enough for mutual support, this still meant no more than a dozen guns protected any facility. The 127mm and 120mm antiaircraft guns had a theoretical effective ceiling of 27,000–25,000ft, but rarely achieved hits above 20,000ft. There were also a few 75mm and 3in guns at Truk, which had an effective ceiling of 18,000ft.

Japan's best light antiaircraft gun was the 25mm gun, which could hit targets up to 5,000ft high and was effective against targets within that range. There were also 20mm cannon and 13.2mm machine guns at Truk. These were effective against targets no more than 3,500ft in altitude. The 20mm cannon was more dangerous than the machine guns because its rounds weighed more and were explosive. While these could engage US naval aircraft, which often operated at low altitudes, they could not reach high-flying heavy bombers. Even against low-flying aircraft, their numbers thwarted an effective antiaircraft threat. There were too few to put up the volume of fire needed.

Japan had early-warning radar at Truk, but lacked antiaircraft fire-control radar. Equipment for fire-control radar was sent to Truk in 1943, but US submarines sank the ship on which it was carried. Japan had search radar on Moen, Fefan, Uman, and Tol. There was also a radio direction-finding station on Ulalu. The search radar had an effective range of 150 miles. The antennae were placed to give good coverage for planes approaching from the east or south, but only one station, probably that on Moen, was placed to reliably pick up aircraft approaching from the Marianas. This became an issue after July 1944, when the US began operating from airfields on captured Saipan, Guam, and Tinian.

Radar provided Truk's garrison at least 30 minutes' early warning of impending raids. This allowed time to man antiaircraft defenses and scramble alert fighters to intercept the enemy. Truk lacked integrated fighter direction. Radar reported the bearing and range of incoming

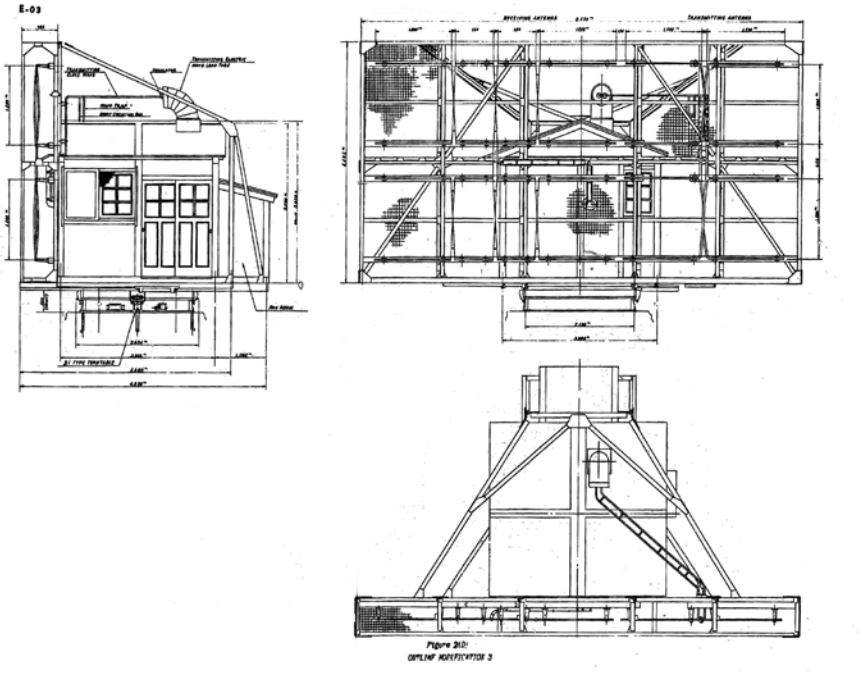
enemy aircraft. Flight leaders then decided on actions to be taken, with the rest of the flight following the leader. Enemy course changes could be radioed to intercepting aircraft, but only flight leaders were equipped with radio.

Until the February 1944 attack, Truk aircraft were kept at a low condition of readiness. A flight of four land-based fighters was launched at dawn, with another 20 kept on alert. The seaplane bases did not maintain any readiness until after the February strikes. Thereafter, they kept three fighter floatplanes on instant alert.

What Truk could resist was an amphibious invasion. By April 1944, Truk was garrisoned with 14,200 soldiers. Major garrisons were placed on Dublon, Moen, Fefan, and Uman, with a smaller detachment on Tol. The 52nd Division's antiaircraft battalion was distributed on these islands and Param. Infantry detachments were also placed on the small islands on the western part of the atoll.

The four passes into the inner lagoon were guarded by both shore batteries and minefields. Moen had a battery of five or six 5in–6in guns dating from the 1895 Sino–Japanese War covering the Northeast Pass. Eten and Dublon each had a pair of twin 127mm dual-purpose guns, while Param had eight 127mm guns that could be used against aircraft and protect its bomber strip, but which also covered the South Pass. Udot held three 203mm guns which could fire at high angles and were capable of dropping plunging fire on all of the atoll's passes. Tol had four 6in guns covering the Piannu Pass on the southwest corner of the atoll. There were also a dozen low-altitude 75mm guns at Truk to cover passes. Originally, these were placed on the coral islands of the atoll, but they were relocated to the inner islands in late 1943 to make it harder for an invader to neutralize them.

Additionally, the passes were mined. While some passes were closed by minefields, others had shore-activated minefields, which could be activated or deactivated as necessary to prevent an invasion force from entering the lagoon or to permit Japanese ships access to it. The combination of Truk's natural defenses, its minefields, shore batteries, and a large garrison would have made invading Truk costly. Japan's problem was that the Allies had no intention of invading Truk.



Side and front view of a Japanese early-warning radar model used at Truk. Radar gave Truk 30 minutes' advance notice of incoming Allied air raids, but the Japanese frequently wasted it through inefficient information distribution practices. (AC)

CAMPAIGN OBJECTIVES

Keystone of the Pacific War

The port, seaplane base, and administrative buildings in Dublon town under attack during the first day of the February 1944 airstrikes by the US Navy. (USNHHC)

Truk played a major role in the wartime objectives of both the Allies and the Japanese. For Japan, Truk was the keystone to their outer defense perimeter. For the Allies, intent upon freeing the Philippines and moving on to Japan, Truk was a roadblock to both goals. The threat it posed had to be removed before either objective could be met.

Japan's war hinged on creating a defensive outer perimeter from Burma in the east, running in an arc that included the Dutch East Indies, New Guinea, New Britain and New Ireland, the coral atolls of the Gilbert and Marshal Islands, and from there to Wake island. This outpost line was to be fortified. The Japanese planned for the US and its allies to exhaust themselves attempting to capture these bastions. After that, it was felt that the Allies would settle for a negotiated peace. Truk was a key to that strategy, being a naval base from which Japan's Combined Fleet could launch attacks against Allied supply lines. Truk could also be used to deliver troops and supplies to Japan's outer perimeter bastions. Truk's airfields were within ferry range of Japanese airfields from Eniwetok to Rabaul, allowing air garrisons to be quickly reinforced, massing aircraft from all other outposts to a threatened one.

For the Allies, Truk was an obstacle to be removed. They could avoid Truk by moving up through New Guinea to reach the Philippines, and then going from the Philippines to Japan. Doing this would triple the length of the supply line required to support Allied forces, however. Instead of moving directly across the Pacific, a roundabout route would be required to avoid Truk. From Hawaii, supplies would have to move south to the New Hebrides, from there to Australia and around New Guinea to the Philippines, then past Formosa before reaching the Ryukyus. It could be done, but it would take more time and a lot more ships. Plus, from an active Truk, Japan's Combined Fleet could rupture Allied logistics by attacking one of several supply hubs along the route.

Thus for both sides, Truk was critical. Geography dictated its importance. As defenders, Japan had a simple objective: hold Truk and deny its resources to the Allies. Maintaining Truk as a fleet anchorage and preserving its air garrison in sufficient strength to interdict

Allied movement would restrain Allied progress against Japan, fulfilling Japan's primary goal of exhausting the Allies.

The Allies, especially the United States, also had a simple objective: to neutralize Truk. Achieving that objective was more complex, however. Did neutralizing Truk mean capturing the bastion, or could it be neutralized by air power, destroying its air garrison and making Truk unusable as a naval port? Regardless, one or the other had to be done. Truk could be bypassed, but it could not be left as a threat.

Allied objectives and plans

In February and March 1943, the Allies drew up the Elkton plan defining strategic objectives for the rest of the year. While that plan focused on New Britain and New Ireland, it included objectives for Truk. As part of a general agreement for a Central Pacific offensive commanded by the United States Navy, Truk and Guam were to be taken in 1944.

This Central Pacific advance became part of a larger plan proposed by the US Combined Chiefs of Staff in May 1943 titled "Operations in the Pacific and Far East 1943–44." It called for an offensive in the Marshalls and Carolines simultaneous with the advance in the Bismarcks. The rationale was twofold. There were sufficient islands around New Britain and New Ireland for airbases to be established, but the restricted waters near Rabaul and Kavieng meant it would make it difficult to use aircraft carriers to best advantage. In the open ocean around the Central Pacific atolls, they had complete freedom of action. Two separate axes of attacks – one up the Solomons and a widely separated second in the Gilberts, Marshalls, and Carolines – would force the Japanese to split their forces or to concentrate on one advance at the expense of the other. Either choice would hasten the Allied advance.

By mid-June, the US Joint Chiefs of Staff directed Admiral Chester Nimitz, commanding the US Pacific Fleet and US forces in the Central Pacific, to submit plans for a Central Pacific offensive. Initially, he was directed to capturing the Marshall Islands of Kwajalein, Wotje,

Task Force 58 at their anchorage in Majuro Atoll in the Marshall Islands in April 1944. Among the ships there are three Independence-class carriers, the USS *Enterprise*, at least four Essex-class carriers, and numerous cruisers and destroyers. (USNHHC)

and Maloelap by December 1, 1943. By August 1943, Woleai, Truk, Yap, and the Palaus in the Carolines were added to the list of Allied objectives, to be taken in 1944.

But then, the planners shifted invasion dates. Before moving into the Marshalls, the Allies were to first clear Makin and Tarawa, Japanese strongholds in the Gilberts, in mid-November. Kwajalein, Wotje, and Maloelap in the Marshalls were next, scheduled for early January 1944. This would be followed in mid-February by Eniwetok in the Marshalls and Kusaie in the Carolines. An invasion of Ponape would occur in early June, with Truk to be captured during September.

This plan yielded a slow, deliberate advance across the Pacific. The Marianas would not have been taken until early 1945, and the Philippines only after an invasion of Palau. The Ryukyus would probably have been invaded in early 1946, with Japan after that. In early 1944, troops assigned to the Pacific were telling themselves "Golden Gate by '48," expecting not to see the war over for another four years. The results of the reduction of Truk led to alterations of this plan.

As with Truk, Allied war plans initially called for capturing Rabaul and the Gazelle Peninsula on New Britain. This was to be followed up by an invasion of New Ireland and the capture of the Japanese airbase at Kavieng. However, Japanese land forces on the Gazelle Peninsula were sizable enough to prevent a ground invasion. Allied intelligence estimated the garrison at 100,000 soldiers (it was actually higher). Standard army rules of thumb required a three-to-one superiority in ground forces for a successful land offensive. The allies in the Southwest Pacific lacked 300,000 ground troops to commit to capturing Rabaul. Instead, planners chose to isolate Rabaul, neutralizing its usefulness as a Japanese base using air power.

The aerial reduction of Rabaul started in October 1943. By November, it was successful enough for planners to use it as a model in future operations. The Gilberts were captured in November, with Kwajalein and Majuro taken in late January. The US learned valuable lessons at Tarawa, the most important of which was the expensive human cost of capturing heavily guarded islands. One result was that in the first phase of the Marshalls operation, the ungarrisoned Majuro was substituted for Maloelap, held by 3,000 Japanese.

Given the heavy casualties at Tarawa and the successful aerial reduction of Rabaul, planners began investigating by January 1944 alternatives to invading Truk and Yap. Both were thought to be heavily garrisoned. Allied intelligence believed Japan had been fortifying Truk since it left the League of Nations in 1936. However, this was all guesswork, as no aerial reconnaissance had been conducted over Truk prior to or so far during World War II. Aerial reconnaissance flights were not even possible until January 1944.

Admiral Raymond Spruance was the only "black shoe" (non-aviator) officer to command US carrier forces during World War II. He commanded US Navy forces in both US carrier raids on Truk. (USNHHC)

Truk, with a fringing atoll and Japanese facilities on interior mountainous islands several miles from the reef, would have been an especially difficult target. It offered defense in depth. The reef had to be taken first, and the passes cleared of mines. This would have to be done under the fire of batteries presumed to be on both the reef and interior islands. A portion of the reef had to be captured before the interior islands were invaded. Furthermore, due to submerged coral reefs and underwater hazards outside the fringing reef islands, providing naval fire support during amphibious landings on inner islands would be difficult. Only carrier airstrikes could support invading troops.

Carrier aircraft would be at least as effective in reducing ground installation as in ground support. The Pacific Fleet's fast carriers were slated to support the invasion of Eniwetok in February 1944. While a June 1944 invasion of Truk was then still scheduled, Nimitz decided a massed carrier raid on Truk could test the practicality of isolating Truk through air power. The carrier strike force had grown formidably by

January 1944, and could attack "Japan's Pearl Harbor" in greater force than Japan had attacked Pearl Harbor to open United States involvement in World War II.

The raid, which took place on February 17 and 18, revealed Truk was weaker than feared. The Admiralty Islands had replaced Rabaul as a fleet anchorage in 1943 planning. Nimitz believed unoccupied Ulithi, further west in the Carolines, could similarly substitute for Truk as a Central Pacific US Navy anchorage. Given Truk was unneeded as an anchorage and appeared to be vulnerable to air reduction, there now seemed to be no need to occupy Truk.

Nimitz recommended bypassing Truk at a March 1944 meeting with the Joint Chiefs of Staff, and substituting an invasion of the Marianas for the planned June landing at Truk. Taking the Marianas offered two additional advantages: the Marianas airfields placed the B-29 within reach of the Japanese Home Islands, and also cut off Truk from air reinforcement through the Marianas. With the Marianas in US hands, the only way aircraft could reinforce Truk was from the Philippines through the Palaus, a roundabout route. That route could be severed by taking Palau. On March 12, Nimitz's recommendation was accepted. Truk would be neutralized and bypassed, with forces commanded by Nimitz invading the Marianas on June 15 and the Palaus on September 15.

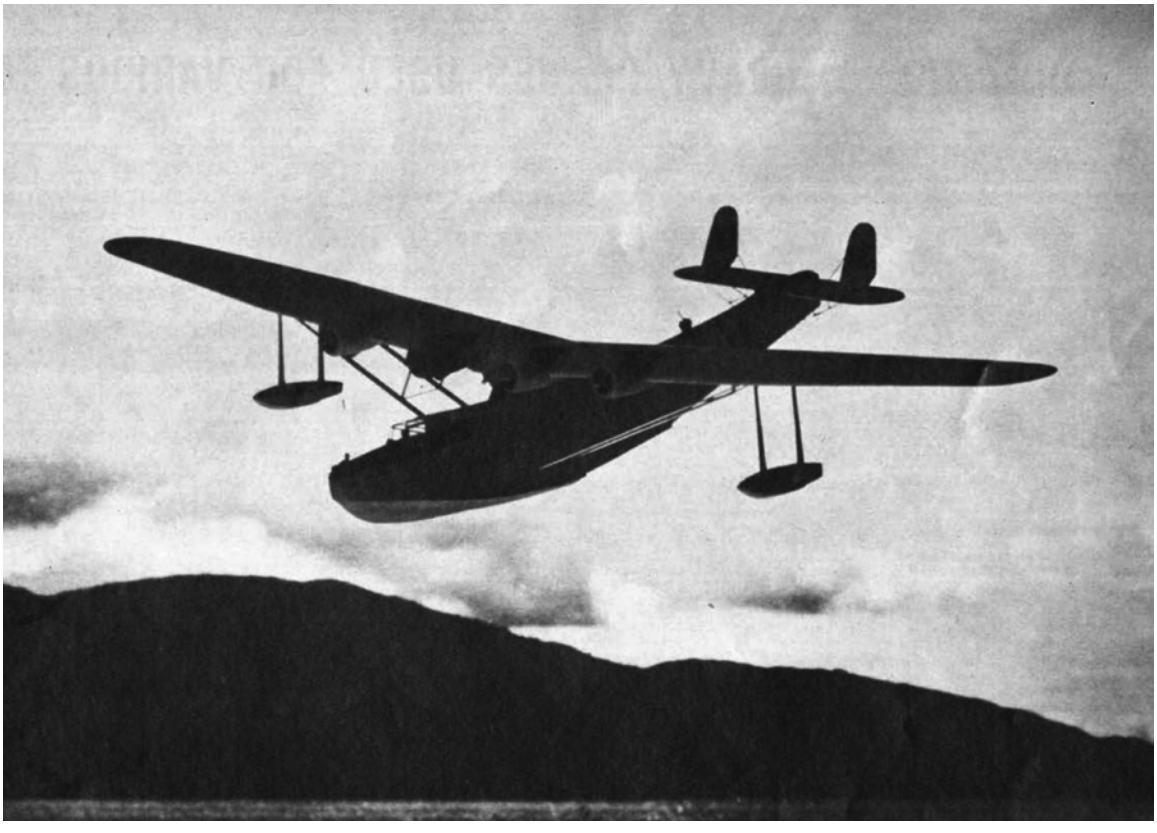
Aboard USS *Monterrey*, one of the light carriers at both Truk US carrier strikes, was Lieutenant Gerald R. Ford, assistant navigating officer. He was then best known as an all-star college football player and lawyer, but went on to become President of the United States. (USNHHC)

For aerial reduction to succeed, it had to be continual. Nimitz needed Army Air Force support to conduct follow-up raids. The Seventh Air Force, headquartered in Hawaii, held responsibility for Army Air Force operations in the Central Pacific. The Thirteenth Air Force, in the Solomons and Southwest Pacific area, was focused on reducing Rabaul and Kavieng, but could be called upon for support, especially after Rabaul operations wound down, as was expected after April 1944.

General Henry "Hap" Arnold, commanding the Army Air Force, agreed to commit the Seventh Air Force to reducing Truk, but decided to send the Thirteenth Air Force to the Southwest Pacific area, under the command of General Douglas McArthur, for his push up New Guinea to the Philippines. Arnold did allow the Thirteenth to attack Truk on an "as-available" basis, something that Thirteenth Air Force aircraft did from March through to June 1944. Seventh Air Force support continued through the rest of the war.

This basic plan was followed for the rest of the war. The US Navy conducted a second round of carrier strikes against Truk in April 1944. The carrier force had been supporting operations in Hollandia. They passed close to Truk returning to their anchorage at Wotje, and used the opportunity to finish what the first set of carrier raids had started. Truk was effectively neutralized by this second raid. Japan lacked reinforcements, especially aircraft, to replace losses following the raid. Keeping Truk reduced remained an ongoing process for the rest of the war. The Army Air Force continued attacking Truk on an almost daily basis until the end of the war.

However, by September, the objective of the raids had gone through another change. Missions against Truk were by then as much for training as for keeping the garrison ineffective. Truk offered an opportunity to expose "green" crews to combat in a low-risk environment. It gave pilots and navigators the opportunity to conduct long-distance missions requiring accurate navigation, allowed bombardiers to sharpen their targeting skills, and exposed air gunners to enemy opposition. Eventually, the Twentieth Air Force used Truk to hone their skills before operating B-29s over Japan, while the British Pacific Fleet used Truk to practice carrier operations prior to facing kamikazes over Okinawa.



A four-engine Kawanishi H6K flying boat. The ability of these aircraft to scout long distances was one reason the US placed a high priority on neutralizing Truk. Their reconnaissance posed a threat to Allied operations in the Central Pacific. (AC)

Japanese objectives and plans

The Japanese had a simple objective when it came to Truk: hang on to the base. However, it was a defective objective. Truk's value lay not in its possession, but in its potential. Truk, due to its central location in the Pacific, was a communications hub and a transfer point. As a hub, Truk was 700 nautical miles by air to Rabaul, 585nmi to Kavieng, 680nmi to Eniwetok, 965nmi to Kwajalein, and 1,165nmi to Majuro, all major bases in Japan's outer defense perimeter. All but Majuro were within easy ferry distance for Japanese fighters and multi-engine bombers.

Naval aircraft could be taken to Truk by ship and then forwarded to where they were needed. Alternatively, aircraft could be flown to Truk via a chain going through the Bonins and the Marianas, or from Formosa to the Philippines and the Palaus. Saipan was 585nmi from Truk, Guam 550nmi, and Palau 1010nmi. Whether going to Truk or leaving it, Truk was the center of a spider's web linking Japanese bastions in the Central Pacific Ocean.

As a fleet anchorage, it was perfectly sited as a jumping-off spot for the Combined Fleet. Rabaul was a day-and-a-half's steaming from Truk: Guadalcanal was a further day's steaming from Rabaul. The Kido Butai, Japan's carrier fleet, could depart Truk and strike south to attack the United States' supply line to Australia. The distance from Truk to American Samoa was significantly less than that the Japanese traveled to reach Pearl Harbor in December 1941. As long as Japan used Truk as a fleet base, that possibility gave US planners sleepless nights. Truk was critical to Japan's war plans both for its defensive capabilities and offensive potential.

None of this mattered if Truk could not be used as a naval base, supply center, or airfield. Simply holding Truk Atoll was strategically sterile, especially if the Allies had alternatives to Truk for use as a naval anchorage or airbase. It could even be a negative factor if Japan sent

resources to Truk in order to simply hold it, rather than to maintain it as a viable naval and air center. Those resources would thus be unavailable for use elsewhere, where they were more urgently needed. Yet that was Japan's strategy, and their war plans were built around it.

This was due in large part to Japan's military doctrine, which emphasized the offensive over everything else. This did not mean Japanese forces lacked the will to fight defensively. Yielding ground was unacceptable. Territory under Japanese control, especially territory they controlled prior to World War II, was to be held. The Japanese fought tenaciously on the defensive; they fought until they died, and very rarely surrendered or voluntarily gave up territory.

Nevertheless, this meant that they often fought ineffectively when on the defensive. Japanese unwillingness to yield ground meant their forces could be isolated and destroyed in detail. The Allies could mass overwhelming force against small garrisons, while bypassing formidable defenses. Japanese aggressiveness frequently led to ill-advised counterattacks, leading to losses which debilitated its defenses.

Admiral Koga Mineichi commanded Imperial Japan's Combined Fleet until April 1944, serving as de facto commander of Truk through to early February 1944. He ordered the Combined Fleet out of Truk days before the first carrier strike against the island. (USNHHC)

Its emphasis on the offense over the defense also often made the defense they did put up less effectual. For example, Japanese destroyers built between 1928 and 1941 generally had a heavier main gun battery than their Allied counterparts, allowing them to outgun British and US destroyers in surface actions. But Japanese guns were single-purpose weapons. The extra weight required for dual-purpose mounts allowing their effective use against aircraft placed a weight penalty that would have reduced battery size. Since antiaircraft fire was defensive, it was sacrificed to produce greater offensive capability.

Yet antiaircraft protection proved important for destroyers during World War II, and grew increasingly so as the conflict continued. US destroyers had dual-purpose main guns; they were as effective defensively against aircraft as they were offensively against surface targets, and encountered enemy aircraft more often than they fought surface warships.

Japan also had a smaller and weaker economy than its major foes, the United States and Great Britain. Japan's pre-war economy was two-thirds that of Britain's and one fifth the size of the United States' economy. Although Japan spent a larger percentage of its economy on its military than either western power, its resources were sharply limited, which intensified its predisposition to emphasize the offensive. Japan had to win wars quickly or it would lose in a battle of attrition.

Unfortunately for Japan, although its opponents were badly battered in the opening six months of the Pacific War, they refused to play the role assigned them in Japan's war plans. They did not surrender, but instead began counterattacking. As 1944 opened, Japan had already lost important conquests in the Gilbert and Solomon islands. It had been pushed on the defensive everywhere in the Pacific, a defensive war for which it was ill-prepared both doctrinally and materially.

Since Truk's importance was recognized by both sides, Japan had depended on defending Truk at a remove before 1944. It had not fortified Truk Atoll prior to 1941, and improved its defenses and installations only marginally in 1942 and 1943. Japan's tenacious defense of Rabaul was an effort to protect Truk. As long as Rabaul held, it was believed Truk would be safe. Japan funneled antiaircraft guns, aircraft, and ammunition to Rabaul that could have been used to defend Truk. The Allies were on their way to neutralizing Rabaul at the close of 1943. Furthermore, the US Navy possessed a formidable carrier force in early 1944, meaning Truk's distant defenses at New Britain, New Ireland, and the Marshalls could be outflanked.

Japan began preparing Truk's defenses to meet these new realities. It could not provide more aircraft: there were no more aircraft to send. By January 1944, Truk already had plenty

Vice-Admiral "King Kong" Hara Chuichi assumed command of the Fourth Fleet the day after the February Truk raid ended, less a promotion than a punishment. He had fallen out of favor due to poor performance during the Battle of the Eastern Solomons. (AC)

of aircraft – 365 in total, with more than 200 fighters. Indeed, it had more aircraft than pilots to fly them. Many aircraft at Truk were supposed to have gone to Rabaul, but remained at Truk due to a shortage of pilots to fly them on to Rabaul. As we have seen, Truk's air defenses were inadequate. It lacked sufficient antiaircraft guns, and the Imperial Japanese Navy had none spare to send to Truk. Its installations, except for a few aircraft revetments at some airfields, were not hardened against air attack.

To protect Truk from invasion, the Japanese Army began transferring the 52nd infantry division there from Japan in November 1943. The first troops began arriving in January 1944, and the transfer was complete by March. Not all of the division's materiel arrived, however. At the beginning of 1944, Truk was under a loose submarine siege, as US Navy submarines were sinking ships sailing between Japan and its island garrisons. Among the items lost were the division's radar equipment, some of its divisional antiaircraft guns, and part of its supplies and ammunition.

The troops would be useful if the Allies actually invaded Truk, but they did little to reduce the threat of air attack or improve Truk's antiaircraft defenses. Moreover, as the division effectively doubled Japanese manpower in Truk, it also doubled the amount of food consumed. Food stocks were barely adequate for the existing garrison, and could not be significantly increased in 1944 due to a lack of Japanese shipping. Stocks of both antiaircraft ammunition and coastal defense shells were also in short supply, which limited the Japanese response to US attacks. Priority had to be given to defending the island against invasion. Ammunition – including for antiaircraft guns – had to be husbanded so as to be available when that happened.

The result was a defensive plan for Truk which was passive and reactive. The garrison would wait until it was attacked, and then counterattack the Allied attackers. When early-warning radar detected an incoming airstrike, available fighters would be launched to intercept the approaching aircraft, vectored in to their probable location by radar. Antiaircraft ammunition would be conserved, with guns firing only when aircraft were in sight, and never in a preventative barrage, which would waste ammunition. An enemy naval task force approaching Truk could be attacked by Truk-based bombers, but only if Japanese air reconnaissance spotted the incoming enemy ships.

There were insufficient reconnaissance aircraft to conduct the necessary searches to detect enemy naval forces before they attacked. That usually meant that Truk bombers could only attack enemy ships after Truk was first attacked, and only with bombers that survived that assault. But whether the bombers attacked while the enemy ships were approaching or withdrawing, there were generally too few Japanese bombers to successfully penetrate US Navy air defenses.

Worse still, this Japanese defensive plan played into the US attack plan. The US intended to lure Japanese fighters into the air so that US naval fighter aircraft – more numerous, of better quality, and with superior pilots – could destroy them. The layered air defenses of US task forces would similarly shred bombers attacking them. This would strip Truk of its air garrison, allowing follow-up waves of US aircraft to neutralize its installations.

However, Japan had no better strategy or plan to offer. It could not maintain Truk as a threat to the Allied advance, nor could it afford the loss of face resulting from evacuating it. It was locked into a losing hand.

THE CAMPAIGN

From feared bastion to the Allies' punchbag

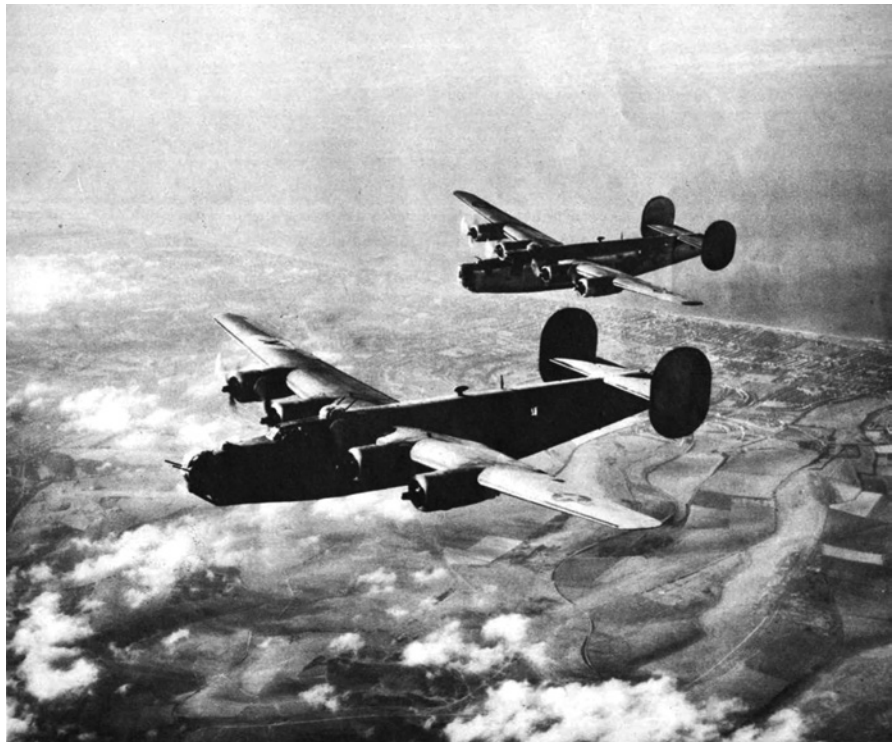
Twelve radar-equipped Grumman Avengers from the USS *Enterprise* flew the first radar-guided night attacks from a United States Navy aircraft carrier during the pre-dawn hours of February 18, 1944. They made 13 hits during the attack. (AC)

Japan gained Truk in 1914. In the opening months of World War I, Japan occupied German holdings in the Central Pacific, taking German-controlled islands in the region with virtually no opposition. When World War I ended, German Pacific holdings, including Truk, were confiscated and transformed into League of Nations mandates. Japan was assigned to be the mandate trustee in the formerly German-occupied islands of the Marianas, Caroline, and Marshall islands. Known as the South Seas Mandate, it was officially titled the Mandate for the German Possessions in the Pacific Ocean lying north of the Equator. It included every island in these groups, with the exception of Guam, which had been a US territory since 1898.

As trustee, Japan did not exercise sovereignty over these islands; it was supposed to administer them for the benefit of its inhabitants. Sovereignty was vested in the League of Nations. Truk was thus not technically part of the Japanese Empire, merely administered by Japan, "under the laws of the Mandatory as integral portions of its territory."

In reality, though, these islands were ruled as part of the Japanese Empire. The islands were administered by the Imperial Japanese Navy between 1914 and 1919. Then the Treaty of Versailles gave sovereignty of the islands to the League of Nations, which assigned them to Japan. Japan excluded other nations from them during World War I, a policy that continued under League of Nations mandate. Truk was administered as a Japanese territory, although it transitioned from direct Navy administration to the Navy's Civil Affairs Board in 1920 and the Ministry of Colonial Affairs in 1929.

The League of Nations mandate forbade fortifying mandate territories, or building military or naval bases in them. At Truk, during the period in which Japan was in the League of Nations and in the years immediately after withdrawing, the Japanese observed this restriction. It maintained no military garrison, while port facilities were those appropriate for supplying the civilian needs of the islands, both Japanese and native. When the Imperial Japanese Navy appeared, it used Truk as an anchorage, refueling from tankers. This was due



Two F-7As on a training run. The F-7A was the photo-reconnaissance version of the B-24 Liberator, its bomb bay filled with cameras. F-7As were used extensively during the reduction of Truk, for pre-mission reconnaissance and post-mission bomb damage assessment. (AC)

less to Japan's honoring the terms of its mandate than because Japan couldn't afford to build a large fleet and militarize its overseas possessions.

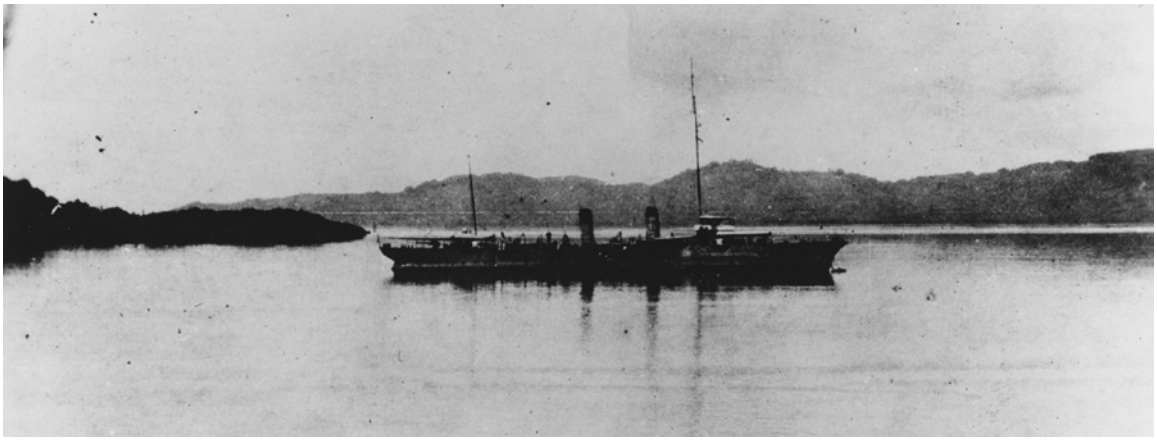
Japan withdrew from the League of Nations in 1933. This should have ended its mandate over Truk and other Pacific islands, but the League lacked the means to expel Japan. Japan refused to leave and continued administering them. This, combined with Japan's isolation of their islands from other nations, led the intelligence services of the Royal Navy, US Navy, and Royal Australian Navy to imagine Truk was heavily fortified and possessed significant naval and military installations.

What was indisputable was that Truk's geographic location made it a key roadblock to an Allied advance to Tokyo. It had to be captured or neutralized before the Allied advanced beyond it. Tentatively during 1943, Allied planners considered the task of dealing with Truk. In the opening months of 1944, they executed their plan, leading to a two-phase campaign which defanged Truk's threat.

Background: 1939–January 1944

On November 15, 1939, the Imperial Japanese Navy created the Fourth Fleet, with the mission of protecting its South Seas Mandate. War in Europe had started 75 days earlier. With Britain distracted by European events, Imperial Japan began asserting a more aggressive posture. A fleet base was necessary. Centrally located and with an outstanding anchorage, Truk was chosen as headquarters for the Fourth Fleet. A base force was created at Truk to coordinate the naval defenses of the Caroline Islands, as were base forces at Saipan in the Marianas and Kwajalein in the Marshalls to coordinate the defenses of those island groups.

Over the next 25 months, formerly sleepy Truk was transformed into Japan's largest naval base outside the Home Islands. Existing port facilities and the seaplane base at Dublon were expanded. Ammunition bunkers, torpedo facilities, and repair and maintenance shops were erected. The seaplane base was enlarged and fuel storage capacity expanded. In November



For the first two decades that Japan held Truk it had no airfield, no naval facilities, and minimal port facilities. During this period, the Imperial Japanese Navy's presence was limited to courtesy visits by small, often elderly warships, such as this pre-war visit by the gunboat *Yodo*. (USNHHC)

1940, shore batteries and minefields were installed to cover the passes allowing entry into the lagoon. Antiaircraft guns were sent to protect the new installations. A supply department was established at Fefan in December 1940. A 2,500-ton floating dry dock arrived in 1941, and in November that year, a month before Japan attacked Pearl Harbor, work on an airfield began, the first of four airfields that would be built in the atoll.

On December 8, 1941, when the Pacific War began at Truk (it was west of the International Date Line), its importance as a base exceeded its available facilities. The occupation of the Marshall Islands, Bismarck Archipelago, New Guinea, and the Solomon Islands were all coordinated from Truk in the war's opening months. Aircraft from Truk's still incomplete Moen No 1 airfield, with its still-primitive facilities, launched the first air raids against Rabaul and Kavieng in January 1942. Troops sent from Truk occupied New Britain and New Ireland the following month. They soon spread to the adjacent Solomons and New Guinea. Truk coordinated the occupation of Makin, and Tarawa in the Gilbert Islands in December 1941, and Nauru starting in May 1942.

By the Battle of Midway, in early June 1942, Truk was Japan's most critical supply and administrative center in the Pacific. Ships sailing from Truk brought supplies and reinforcements to Japanese-occupied territory in an arc from Tarawa in the southeast to Lae, New Guinea, in the southwest. Aircraft were shipped to Truk, assembled, and flown on from there to forward bases. Troops from Japan also moved through Truk before being sent to garrisons guarding Japan's outer defensive perimeter.

In 1942 and 1943, Truk was a boom town. The additional airfields and a new seaplane base neared completion as 1944 approached. Aircraft maintenance and assembly facilities went up at Truk's airbases, to support the hundreds of aircraft passing through. The supply depot at Fefan swelled, reaching its full capacity only in December 1943.

But even at its height, Truk had only limited facilities. By 1944, its service craft consisted of 50 sampans, ten 15-ton tugs, one 600-ton tug, three 800-ton tugs, three water lighters, three fuel barges, and 17 small yard craft. Its repair facilities were also limited: they could not repair major battle damage on vessels larger than destroyers. Truk's yards could only make temporary repairs on battle damage to larger warships, sufficient to allow them to return to Japan for permanent repairs.

These deficiencies proved a problem. In December 1941, the Fourth Fleet was a collection of destroyers, overaged light cruisers, armed merchant cruisers, minesweepers, and attack transports capable of moving a battalion-sized Special Naval Landing Force to invade Allied islands. By July 1942, Truk was home port for the Combined Fleet: Battleship Division 1, four cruiser divisions, Carrier Division 3 (with Naval Air Flotillas 1 and 2), two destroyer squadrons, and two submarine squadrons.

Japan's Fourth Fleet was headquartered at Truk. It consisted of a small number of auxiliary cruisers and elderly light cruisers and destroyers. These included four obsolescent Kamikaze-class destroyers, like the one pictured. (AC)

The fleet's battleships (*Yamato*, *Mutsu*, and *Nagato* before *Musashi* became operational, *Yamato* and *Musashi* thereafter), two aircraft carriers, ten to 12 heavy cruisers, and 18–24 destroyers were a significant proportion of Japan's naval power. Permanently stationed at Truk, they strained its maintenance and supply capabilities. And they were not the only Japanese warships using Truk. Except for the slow battleships, virtually every major warship in the Imperial Navy spent time in Truk between July 1942 and January 1944. They required fuel before steaming into combat (typically around the Solomons) and frequently temporary repairs on the way back. The fleets that fought at the carrier battles of the Eastern Solomons and Santa Cruz and the surface actions in "the Slot" also came through Truk.

Similarly, Truk was the hub of the Imperial Navy's air forces in the Central Pacific. Carrier pilots trained at Truk, which was also the transit point for naval pilots and aircraft moving to Rabaul during the Solomons campaign. But Truk lacked aircraft mechanics and fitters in numbers large enough to service and assemble the aircraft arriving there, so there was always a backlog of aircraft awaiting assembly. Furthermore, there were never enough pilots to ferry all the assembled aircraft to combat zones. The Imperial Navy's flight schools were turning out too few of them. The number of aircraft at Truk increased over time as more arrived, many remaining there because they were unserviceable or the Japanese lacked crew to send them where they were needed.

Throughout 1943, Japanese naval forces defended Truk at the margins of the Japanese defense perimeter. Truk's resources were shipped to Rabaul to keep US forces too far away from Truk to attack it. However, this led Japan into an attrition struggle for which it was ill-prepared. It could not afford even exchanges of losses. In the naval fighting around Guadalcanal, the exchange rate favored the Allies rather than Japan, especially after the first round of battles from August–October 1942. Ships damaged had to limp back to Truk. There, they faced an even longer voyage to Japan before their damage could be set right.

The air exchange rate was even worse for Japan, a trend that accelerated from the beginning of 1943. A new generation of Allied fighter aircraft appeared that year: the P-38 Lightning, F6F Hellcat, and F4U Corsair. These proved vastly superior to both Japanese Army and Navy fighters, including the previously much-feared Zero. Worse still, most of the Imperial Navy's air losses occurred over the ocean or Allied-held islands. As the Japanese lacked an effective air-sea rescue system, aircrew shot down in those circumstances were generally lost. Since the Japanese Navy's aircrew training produced insufficient numbers to replace losses, by the summer of 1943, Japan lacked enough carrier-qualified pilots to

The Imperial Japanese Combined Fleet operated out of Truk through much of 1942 and 1943. In this photo, the Japanese battleships *Yamato* (left) and *Musashi* (right) are captured moored in Truk Lagoon sometime during 1943. (USNHHC)

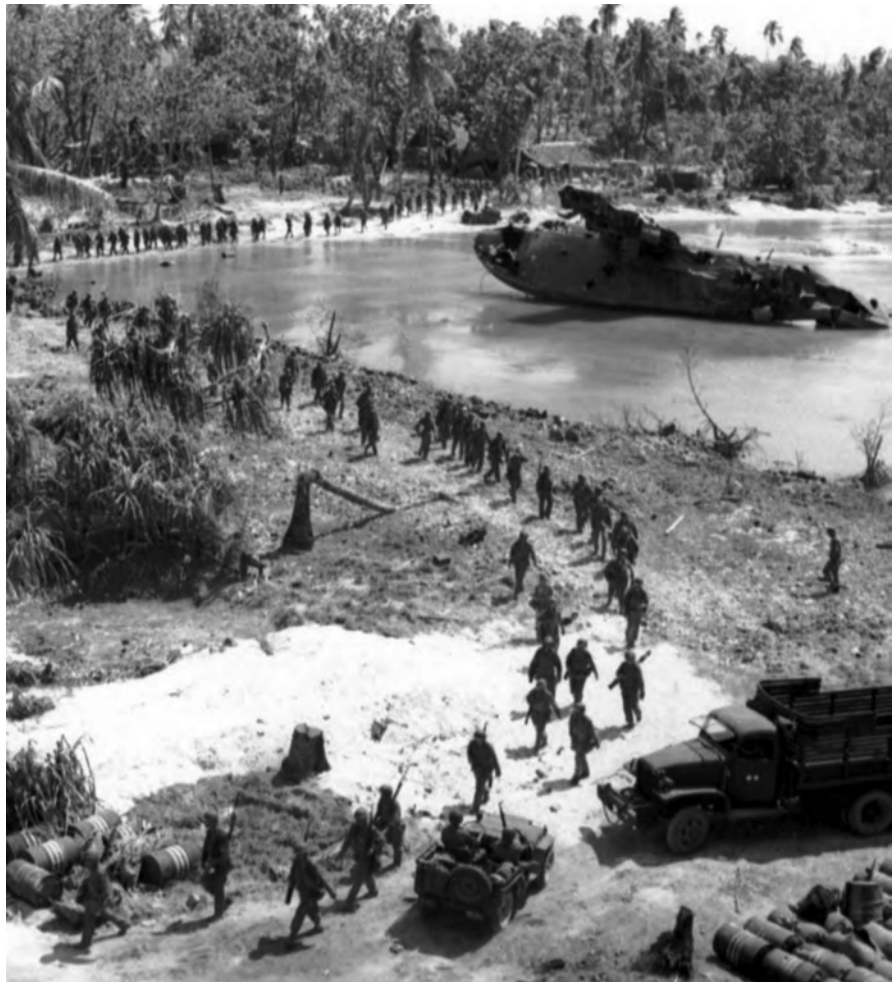
maintain full air groups on their aircraft carriers. The quality of new pilots was lower than those with which Japan had started the war.

All this left Japan unable to hold its outer defense perimeter. United States forces secured Guadalcanal in the first week of February 1943, then spent the rest of the year moving up the Solomon chain, culminating in the capture of Bougainville in November 1943. By the end of December, the United States was operating fighters and multi-engine bombers out of Bougainville's airfields at Piva and Torokina. It had also landed at the western end of New Britain at Aware and Cape Gloucester, building airfields there. These new airfields brought Rabaul within range of Allied tactical bombers, making its ultimate neutralization inevitable. This stripped Truk of its outer defenses to the south and southwest.

The situation was even worse for the Japanese in the southeast. In November 1943, the United States invaded Makin and Tarawa atolls in the Gilberts. The Japanese had taken these islands with a miniscule number of troops in December 1941. They built an airfield on Tarawa and a seaplane base on Makin, emplacing shore batteries on both islands. There was a 2,600-man SNLF (Special Naval Landing Force) unit garrisoning Tarawa and 800 combatants at Makin. The US landed a Marine division on Tarawa and an Army division on Makin, supporting the troops with the gunfire of seven old battleships, plus six heavy and two light cruisers, and air support from six escort carriers.

The Imperial Japanese Navy did not send aircraft from Truk to Tarawa. None were even sent to Kwajalein, 520nmi from Tarawa, a distance from which Japanese torpedo bombers and G4M twin-engine bombers could easily target slow, vulnerable battleships and escort carriers. Truk had no spare aircraft to send, as Japanese reserves had been exhausted during the year-long struggle in the Solomons and New Guinea. Nor did the Japanese Combined Fleet sail to oppose the landing.

The Combined Fleet could have defeated the slow old battleships and escort carriers supporting the invasion force. However, the invasion fleet was guarded by another US fleet, one made up of its fast warships: seven fleet carriers and four light carriers, supported by five fast battleships, three heavy cruisers, three antiaircraft light cruisers, and 20 destroyers. The Combined Fleet would have to survive a gauntlet of unopposed enemy aircraft just to reach the invasion fleet. Once there, they would have to fight a surface action with 12 US battleships, five of which could keep up with the *Yamato* and *Musashi*. The Imperial Navy's High Command recognized the impossibility of the task. Any confrontation had to wait until the Kido Butai rebuilt their carrier air groups. The Combined Fleet thus remained in Truk, leaving the Gilberts to their fate.



The Japanese had not expected to need to defend Truk, as it was too far from Allied bases for them to attack it. However, the fall of Tarawa and Makin (shown with US troops advancing) in November 1943 brought the war closer to Truk. (AC)

The next blow to Truk's defenses fell the following month, when the US Navy sent a carrier task force from Pearl Harbor to attack Kwajalein. It was the first time since February 1942 that US aircraft carriers had attacked Kwajalein. The 1942 raid was conducted by a single carrier, USS *Enterprise*. Now it was back, along with three other fleet and two light carriers and 386 aircraft. The task force used an unexpected approach route unpatrolled by Japanese reconnaissance aircraft and picket ships. The first strike, launched at dawn on December 4, 1944, was undetected until Japanese search radar picked up the incoming aircraft – a strike force of 250 fighters and bombers.

The warning allowed the Japanese to scramble 50 aircraft. Three dozen of these were shot down by the attacking US Navy aircraft, and the raid destroyed another 19 on the ground; three bombers and 16 fighters. Aircraft striking the seaplane base at Ebeye Island destroyed another 18 seaplanes. Other US bombers worked over the ships in Kwajalein's harbor, sinking four large transports (including a spectacularly destroyed ammunition ship) and damaging the light cruiser *Nagara*. US losses totaled just five aircraft.

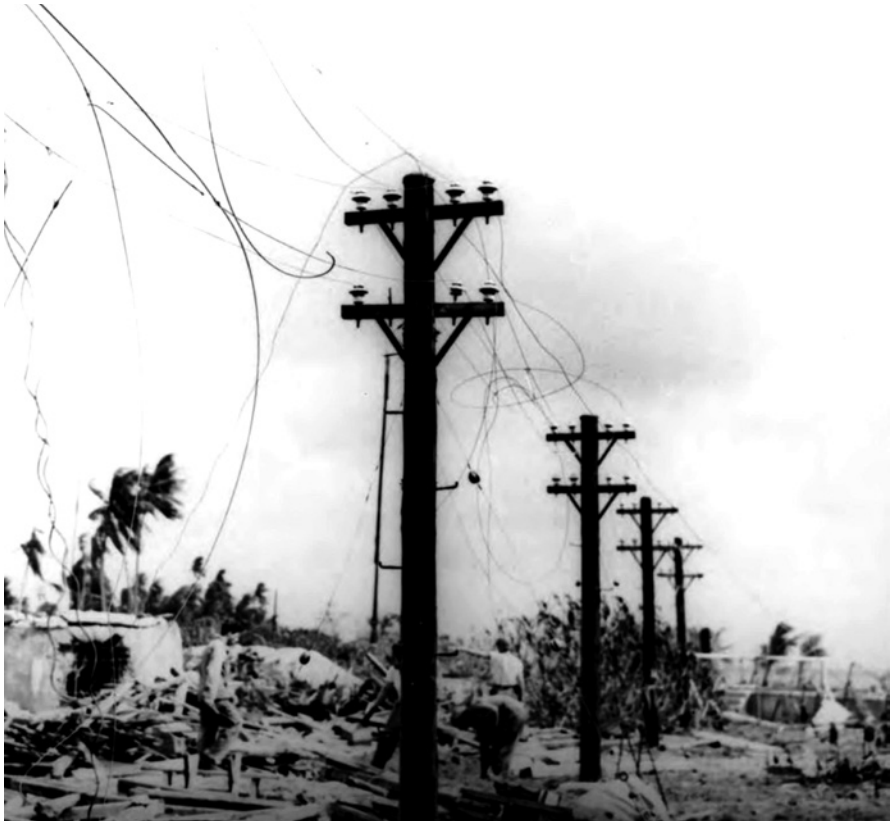
The results of the 45-minute raid were disappointing for the US Navy, despite these successes. Out of 30 vessels in the lagoon when the raid occurred, only four were sunk. A lack of practice led to very poor torpedo accuracy. Of the 36 torpedoes launched, no more than five hit their target. Avengers armed with bombs did more damage than those armed with torpedoes. Moreover, the opportunity to work over the bomber-packed airfield at Roi

was muffed, with only 16 Hellcats strafing the field. Their returns were paltry. Lacking pre-mission photo reconnaissance images, they were deceived by camouflage, leaving 30–40 Japanese bombers undamaged.

Admiral Charles Pownall, commanding the US force, canceled an afternoon second strike on Kwajalein, and all other strikes in the Marshalls except for one at Wotje, east of Kwajalein and on the way home. He was concerned about potential Japanese counterattacks, with aircraft staged from Japanese bases at Wotje and Maloelap as well as Kwajalein. The Japanese air garrison at Kwajalein was estimated at 150–200 aircraft, and two-thirds of them survived the US strike. Intelligence believed Wotje and Maloelap held similar numbers. While Task Force aircraft outnumbered those of any one airfield, Pownall feared that with surprise lost, he could be outnumbered. Furthermore, he was in the heart of the Marshalls, a long way from home.

Yet Japanese counterattacks failed to meet his concerns. Two sets of attacks, the first by three Nakajima B5N torpedo bombers and the second by a group of four, occurred between 1100hrs and 1300hrs. Six of the seven were shot down, doing no damage. The Wotje strike was launched after that, all aircraft recovered by 1500hrs. After dark, the Japanese launched a series of night attacks with B5N and G4M bombers. Tracking aircraft lit up the US ships with parachute flares, while torpedo-armed aircraft attacked the illuminated targets.

The attacks started at 2255hrs and continued until after the moon set at 0124hrs. Some 30–50 bombers attacked in 14 separate waves, individually and in groups of between four and 12 aircraft. The US Navy lacked night fighters, and the only defense was antiaircraft fire. Only one hit was scored by the Japanese, but it was serious: a torpedo struck the Essex-class *Lexington* in the stern, temporarily damaging its steering and destroying a propeller shaft. Damage control restored steering and the *Lexington* was soon steaming at 21 knots.



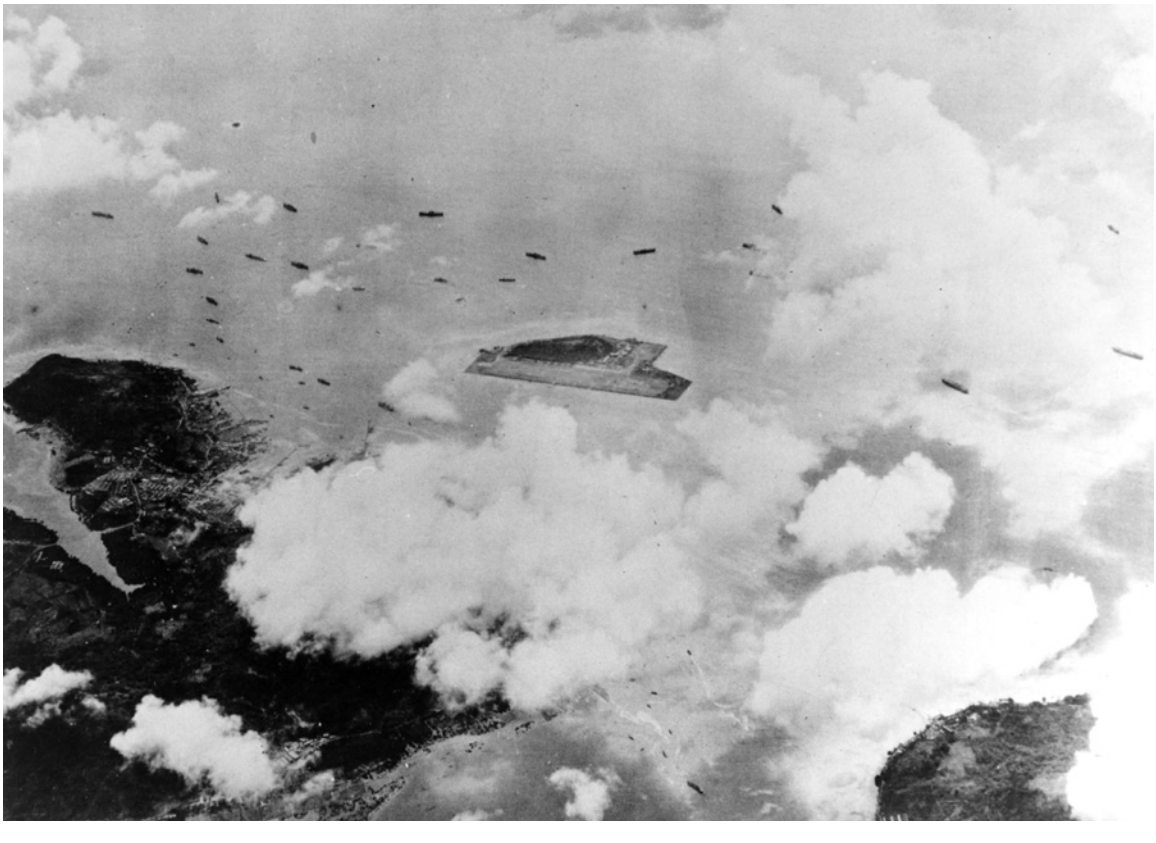
The next outpost to fall was Kwajalein in February 1944. Putting US ground troops on the atoll provided a location within range of Truk capable of holding an airfield. (AC)

In exchange, 29 Japanese bombers were shot down, including 18 G4Ms. The Japanese attempted a mass strike on the retiring US task force while it was still in range of Wotje, but were unable to find the enemy.

The raid was the US Navy's first independent mass carrier mission against a Japanese island bastion. There had been others, but these were just nuisance raids of one or two carriers carried out in 1942. This was not a nuisance raid; it was a test of the new carrier force's ability to neutralize an outpost using air power. The closest parallel was the two-carrier tactical strike against Truk in November 1943 that was intended to prevent a Japanese cruiser force from disrupting the Allied invasion of Bougainville. The Kwajalein raid was different, a test of the concept of using aircraft carriers to project power strategically.

The United States took lessons from the raid. The raid's failures were largely due to intelligence gaps, emphasizing the need for photo-reconnaissance flights prior to an airstrike. The Japanese switch to night bombing also underscored a need for carrier night fighter capabilities; this was added by February 1944. Finally, the raid showed the need for both mass and persistence. Six carriers was on the light side, but three other carriers, which would have brought the total force to six fleet and three light carriers, had been tasked for a second carrier raid on Rabaul and Kavieng – raids with disappointing results again due to too few aircraft. Follow-up raids were also necessary for maximum results, both to increase damage to the enemy and suppress any potential counterattack.

For the Japanese, the raid emphasized the vulnerability of their islands to air attack. Kwajalein had heavy flak protection. Radar gave warning soon enough to get aircraft in the air before the attackers arrived, and Kwajalein had a large air garrison. Yet they were only able to shoot down a handful of the attackers, while defending aircraft took heavy casualties. That the raid inflicted relatively little damage was realized to have been luck rather than



On February 4, 1944, a lone PB4Y Liberator flew a photo-reconnaissance mission over Truk, capturing this image. Seen are ships of the Combined Fleet, Dublon – with its seaplane base and facilities bottom left – Fefen and its supply center bottom right, and Eten and its airfield in the center. (USNHHC)

skill. The Japanese could not rely on future attackers to be as inaccurate or hesitant as those who attacked Kwajalein.

Japanese concerns only grew over the next two months. In January 1944, the United States revisited Kwajalein Atoll, this time for good. The US swooped in again from Hawaii instead of the expected route from the Gilberts. They took Kwajalein and Majuro Atoll at the end of January, ignoring the more heavily garrisoned Jaluit, Maloelap, Mili, and Wotje. Airstrikes from newly captured Kwajalein and the Gilberts reduced the airfields on the remaining Japanese-held islands to ineffectiveness, transforming them into self-administered prisoner-of-war camps for the rest of the war.

Eniwetok was the next destination in the Allies' advance towards Tokyo. The islands previously taken had been within ferry range of Truk; Eniwetok was within Truk's air combat radius. US planners worried that massive Japanese airstrikes from Truk could disrupt the Eniwetok landings. A US carrier strike on Truk prior to Eniwetok's D-Day was intended to neutralize that threat. It would also determine whether Truk needed to be taken or, like Rabaul and Maloelap, it could be bypassed.

Mindful of the need for aerial reconnaissance, a lone PB4Y Liberator, operated by a Marine crew, took off for Truk from Bougainville's Torokina airfield on February 4, 1944. It carried cameras and film rather than bombs. The round-trip was 2,000 miles. Clouds covered part of the islands, but pictures were taken of the major land-based installations, which was useful for intelligence planning. More importantly, Truk Lagoon was filled with warships: a battleship, two aircraft carriers, six heavy cruisers and four light cruisers, 20 destroyers, and 12 submarines. The PB4Y was spotted and fired on by warships in the harbor. Several fighters were also launched to intercept, but only one, a floatplane fighter, came close enough to open fire. The Liberator accelerated and outran its pursuer without receiving significant damage, and returned safely to Torokina. The reduction of Truk was about to begin.

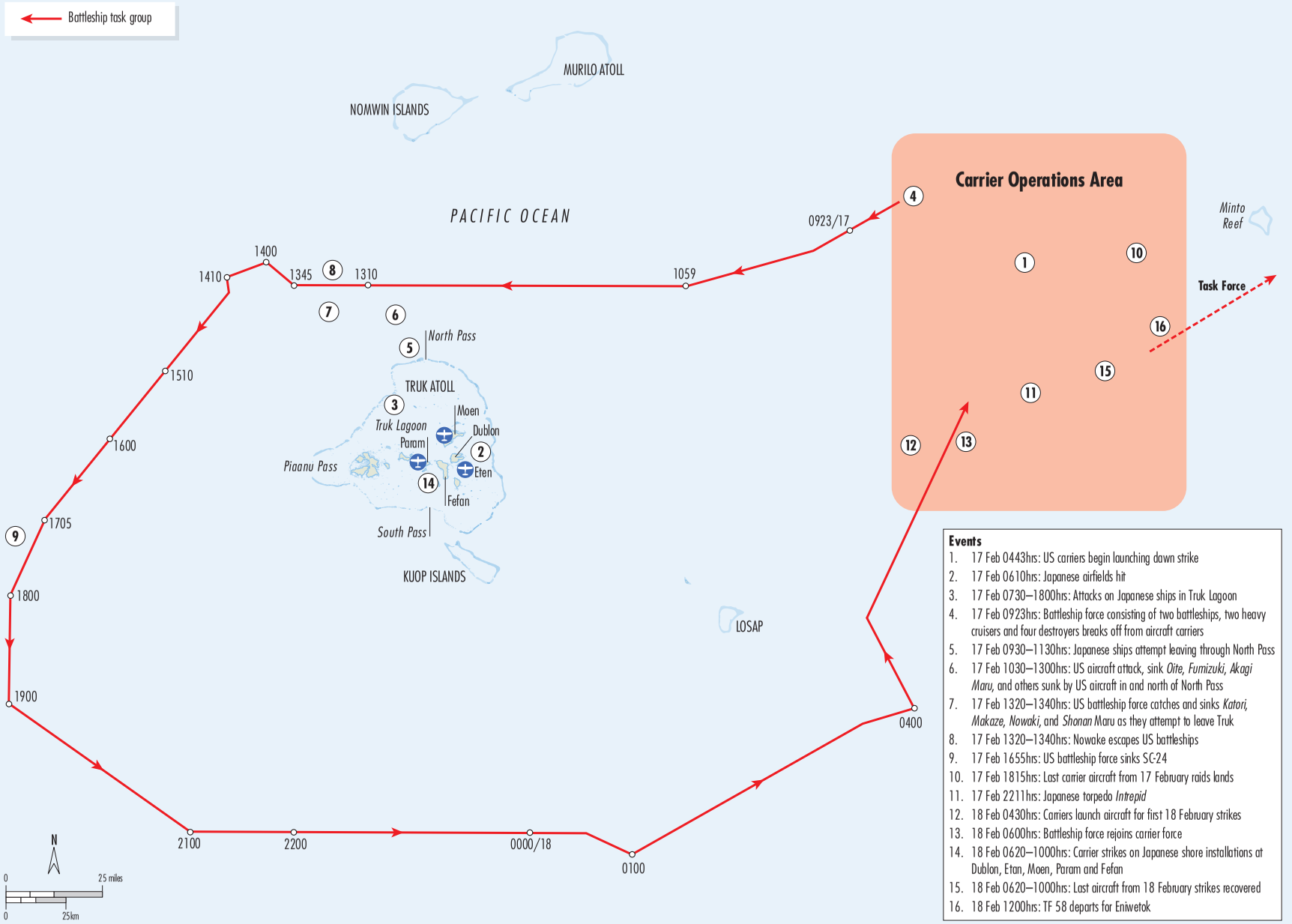
Operation *Hailstone*: February 1944

The invasion of Eniwetok was scheduled for February 17, 1944. The nearest Japanese airfields to it were in Truk. To prevent Truk's aircraft from intervening with the invasion, the US Navy planned a carrier airstrike at Truk to begin the same day. Named Operation *Hailstone*, it was bigger than December's raid on Kwajalein, using three carrier task groups instead of two. The US Fifth Fleet (commanded by Vice-Admiral Raymond Spruance) sent Task Force 50 (Truk Striking Force) and three of Task Force 58's four fast carrier task groups (Fast Carrier Force).

Five fleet carriers were used: the *Enterprise*, *Yorktown*, *Essex*, *Intrepid*, and *Bunker Hill*. The first was the surviving carrier of the pre-war Yorktown-class; the rest were Essex-class. Accompanying them were four Independence-class light carriers: the *Belleau Wood*, *Cabot*, *Cowpens*, and *Monterey*. Four other carriers were held in reserve. Three – the *Saratoga*, *Langley*, and *Princeton* – were assigned to cover the Eniwetok landings, scheduled immediately after Operation *Hailstone*. The *Lexington* was completing repairs to damage suffered in December's Kwajalein raid.

The aircraft carriers attacking Truk were joined by six fast battleships: the *New Jersey*, *Iowa*, *North Carolina*, *Massachusetts*, *Alabama*, and *North Dakota*. Five heavy cruisers, five light cruisers, and 25 destroyers completed the escort screen. Ten submarines lurked outside Truk Atoll, operating independently of the carrier task force but on hand to intercept fleeing Japanese warships and rescue US Navy fliers downed during the attack.

The PB4Y's reconnaissance overflight had warned the Japanese of Truk's peril. They interpreted it as the precursor for an air raid on Truk, predicted to occur on February 21. Admiral Koga Mineichi, commanding the Combined Fleet, ordered Truk's ships to depart the lagoon before that date. The departure was hasty. Two auxiliary aircraft carriers had arrived



Events

1. 17 Feb 0443hrs: US carriers begin launching dawn strike
2. 17 Feb 0610hrs: Japanese airfields hit
3. 17 Feb 0730–1800hrs: Attacks on Japanese ships in Truk Lagoon
4. 17 Feb 0923hrs: Battleship force consisting of two battleships, two heavy cruisers and four destroyers breaks off from aircraft carriers
5. 17 Feb 0930–1130hrs: Japanese ships attempt leaving through North Pass
6. 17 Feb 1030–1300hrs: US aircraft attack, sink *Oite, Fumizuki, Akagi Maru,* and others sunk by US aircraft in and north of North Pass
7. 17 Feb 1320–1340hrs: US battleship force catches and sinks *Katori, Makaze, Nowaki,* and *Shonan* Maru as they attempt to leave Truk
8. 17 Feb 1320–1340hrs: Nowake escapes US battleships
9. 17 Feb 1655hrs: US battleship force sinks SC-24
10. 17 Feb 1815hrs: Last carrier aircraft from 17 February raids lands
11. 17 Feb 2211hrs: Japanese torpedo *Intrepid*
12. 18 Feb 0430hrs: Carriers launch aircraft for first 18 February strikes
13. 18 Feb 0600hrs: Battleship force rejoins carrier force
14. 18 Feb 0620–1000hrs: Carrier strikes on Japanese shore installations at Dublon, Etan, Moen, Param and Fefan
15. 18 Feb 0620–1000hrs: Last aircraft from 18 February strikes recovered
16. 18 Feb 1200hrs: TF 58 departs for Eniwetok

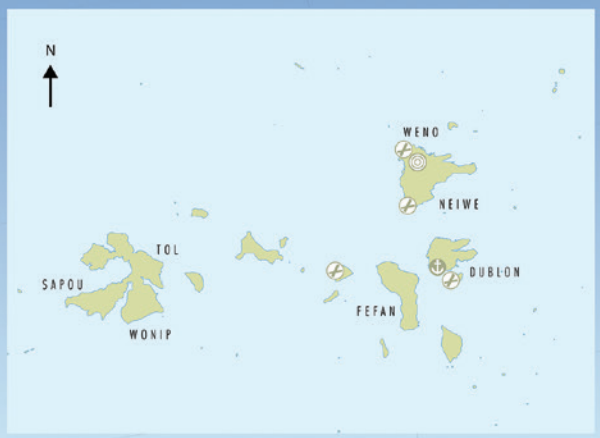
at Truk the previous month. When the departure order came, they haphazardly unloaded their aircraft in order to leave quickly. The aircraft were left parked nose-to-tail on airport aprons and taxiways. Cargo ships equally hastily unloaded stores so they could leave. Fuel barges were drained to top off the tanks of the Combined Fleet's major units. They had to be tediously refilled from tankers, a task made difficult by choppy seas kicked up by rough weather between February 13 and 15.

On February 12, most of the Combined Fleet's major units left Truk for Palau. The light cruiser *Agano*, previously damaged and under repair, did not depart until February 16. Its departure was so late that it was caught and sunk by the newly arrived US submarine screen. Other ships were still preparing to leave, their departure delayed by bad weather and slow refueling. On February 17, the Fourth Fleet, with its light cruisers and destroyers, and the submarines of the Sixth Submarine Fleet, were still at Truk. So were various repair ships, tenders, fleet oilers, and service vessels which had been supporting the Combined Fleet, along with several dozen transports, cargo ships, tankers, and naval auxiliaries.

The three US fast carrier task groups departed the newly established anchorage at Majuro on February 12, the same day the Combined Fleet left Truk. The US force steamed north of Eniwetok, rendezvousing with fleet oilers on February 15. They then made a high-speed run southwest, arriving at an attack point 90nmi east-northeast of Dublon before sunrise on February 17. The roundabout path was taken to avoid detection prior to the attack. That goal was achieved. The first warning Truk's garrison received was when its early-warning radars spotted the first US Navy aircraft sweeping toward Truk.

This first wave consisted exclusively of fighter aircraft, containing 72 F6F Hellcats launched from the five fleet carriers. The *Bunker Hill* sent 24; the other four carriers sent

The Marine crew and the PB4Y Liberator that flew the February 4 mission over Truk, photographed soon after their return from Truk. The overflight convinced Admiral Koga to have the Combined Fleet evacuate Truk. (USNHHC)



KEY

Japanese Forces

- Moen No.1 Aircraft
- Moen No.2 Aircraft
- Eten Aircraft – Unit 1
- Eten Aircraft – Unit 2

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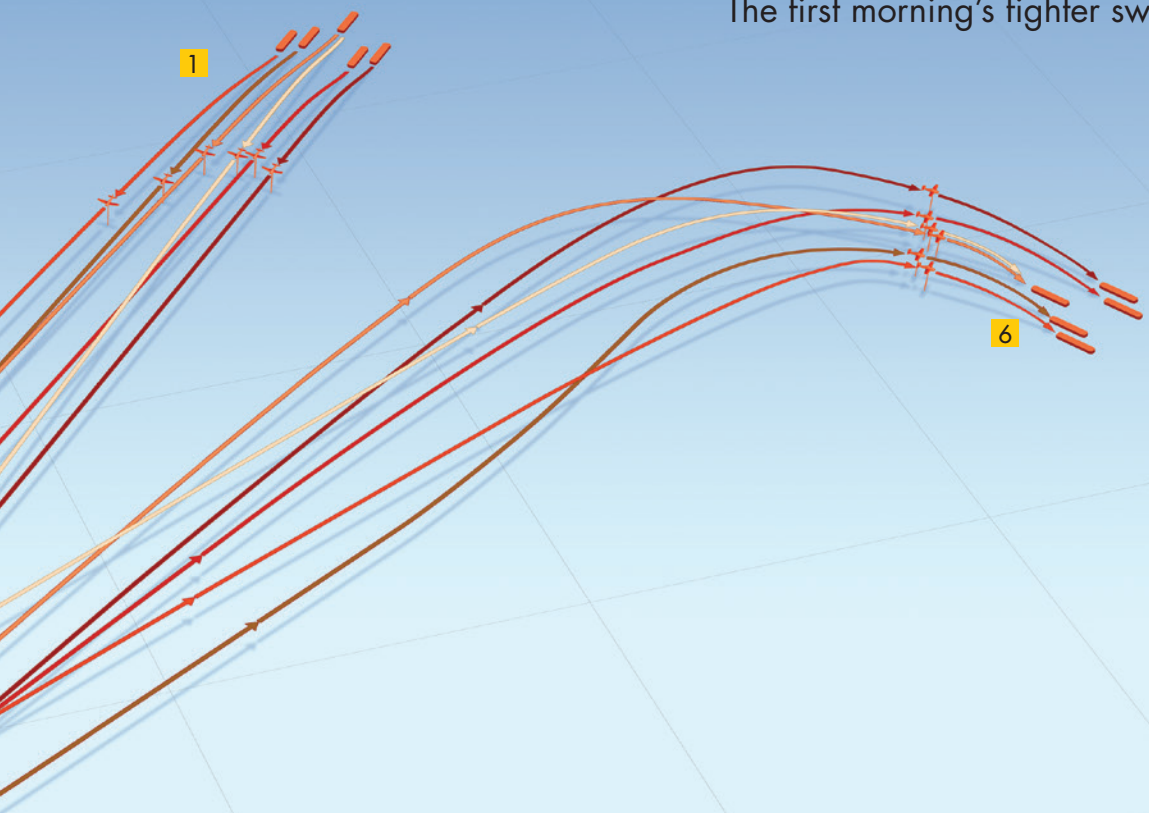
Hailstone in the Morning

The first morning's fighter sweep



KEY

US Navy Units

- VF-18-2
- VF-18-1
- VF-5
- VF-10
- V-9
- VF-6

EVENTS

1. 0450hrs: F6F fighters take off from US carriers
2. 0540hrs: Japanese radar detects incoming US fighters
3. 0027hrs: Japanese fighters begin scrambling from Moen No.1, Moen No. 2, and Eten airfields
4. 0610–0640hrs: US fighters intercept, overwhelm, and shoot down Japanese fighters
5. 0700–0730hrs: US fighters strafe Moen No.1, Moen No.2, Param, Dublon, and Eten airfields
6. 0830hrs: F6Fs land back on carriers

The first thing the US Navy did during Operation *Hailstone* was to attack the Japanese airfields at Truk. This photo shows Moen No 2 burning after the morning attack, marked by a large plume of smoke and fire. The airfield was abandoned following the raid. (USNHHC)

a dozen each. Their mission was to knock out enemy air power; a massive fighter sweep to clear the skies of enemy fighters prior to sending in the bombers. It was a new technique, developed by Admiral Marc Mitscher, commanding the task force's aircraft carriers. This was its first test in combat.

Japanese doctrine called for four fighters airborne and 20 more on alert for takeoff at daybreak, with four fighters launched prior to sunrise. Regardless of this, the morning attack caught the Japanese unprepared, as no aircraft were in the air when radar detected the incoming US aircraft. Param, with 30 minutes' warning, began launching aircraft. Eten had only 10 minutes' warning, while Moen No 1 was alerted only as US aircraft arrived at the field. Many of the pilots whose airplanes were at Moen and Eten were on Dublon when the attack began. Despite that, the Japanese launched 90 aircraft, half of which attempted to intercept the US fighters.

The Hellcats arrived at local sunrise (0610hrs), sweeping aside the Japanese air opposition. Of the 45 Japanese aircraft intercepting the Hellcats, 30 were shot down in the opening minutes of the fight. The Japanese counterattack was uncoordinated, and the Japanese pilots appeared (to the US fighter pilots) to be inexperienced. Having swept the skies of opposition, the Hellcats turned their attention to the four airfields on Moen, Eten, and Param, and the seaplane base at Dublon. Strafing the airfields, they destroyed another 40 aircraft on the ground, mostly in the open on runways and taxiways, eliminating those most ready to fly.

The fighter sweep was ending when the next wave of attackers came in; 18 Avengers, six from each of the three task groups. These torpedo bombers were loaded with incendiaries and fragmentation clusters. They were showered down on the aircraft dispersal areas at Moen, Eten, and Param, destroying aircraft in revetments as well as those at Eten lined up

nose-to-tall in the open. Aircraft missed by strafing and bombs were destroyed when those next to them exploded or caught fire, igniting them in turn.

Mitscher's new approach delivered beyond expectations. Of the 365 Japanese aircraft at Truk that dawn, most had been rendered incapable of flying by the following day. Fifty-six, including 51 fighters, were shot down. A total of 125 operational aircraft and 110 air arsenal aircraft (awaiting assembly or repair) were destroyed or seriously damaged on the ground. The total cost to the Allies was only four Hellcats lost. But this was just the opening act.

As the surviving 68 Hellcats and 18 Avengers headed back to their carriers, the next attack wave arrived. These aircraft concentrated on the shipping in Truk Lagoon. Carriers began launching full deckload strikes (half of their available aircraft), staggering the launches so that there were aircraft – fighters, dive bombers, and torpedo bombers – over Truk virtually continuously for the rest of the day. Thirty strikes were made before dusk closed down activity, averaging one new strike every 20 minutes.

Each strike contained 18–30 aircraft. The smaller strikes came from the light carriers, while the fleet carriers could launch up to 30 aircraft in one attack. Carriers averaged four separate aircraft launches during February 17. Most aircraft flew at least two missions during the day. Both bombs and torpedoes were used, although most of the Avengers carried only bombs on their missions. A maximum of 70 torpedoes were dropped. In all, 400 tons of munitions were expended on Japanese shipping.

The ships that remained in Truk Lagoon were devastated. The aircraft ferry *Fujikawa Maru* was one of the first sunk, caught by torpedo bombers from the *Yorktown* in the first strike. Shortly after, the submarine tender *Rio de Janeiro Maru* was hit by 1,000lb bombs dropped

The sinking of the *Oite*, February 17, 1944

During Operation *Hailstone*, the United States Navy concentrated its efforts on Truk's air garrison and the ships in Truk Lagoon. The air garrison was largely knocked out of the battle in the first hours of the assault by a dawn fighter sweep, immediately followed up with bombers dropping fragmentation bombs on the airfield. The Navy then spent the rest of the day sinking ships.

While the main body of Imperial Japan's Combined Fleet hastily departed Truk less than a week before the US strike, there were still plenty of ships in the harbor, both merchant vessels and warships. During the day of February 17, eight warships and over 30 merchant ships or naval auxiliaries were sunk by the US Navy. While a few were sunk by surface warships circling the atoll to catch escapers, most fell victim to US Navy aircraft.

Among them was the *Oite*. One of nine Kamikaze-class destroyers built for the Imperial Japanese Navy in the early 1920s, it was elderly, the Japanese equivalent of the US Navy's flush-deck destroyers. It was armed with 4.7in guns, instead of the 127mm guns of the latest classes of World War II Japanese destroyers. Early in the war, it and its sisters were modified to improve their antisubmarine capabilities. One main gun and the aft torpedo tubes were removed, leaving it with a main battery of three 4.7in guns and only four torpedo tubes by 1944. Extra depth charge throwers and 25mm antiaircraft guns replaced the original armament. The *Oite* along with several class sisters had been relegated to the Fourth Fleet at the start of World War II. It participated in the invasion of Wake Island in 1941 and Central Pacific convoy escort duty in 1942 and 1943.

The *Oite* was unique in that it was sunk entering Truk Lagoon rather than exiting it. The previous day, the light cruiser *Agano* had been sunk by a US submarine guarding the route between Truk and the Palau Islands. The *Oite* had picked up 523 survivors and was returning to Truk to unload them, when it steamed into the US airstrike.

The *Oite* attempted to escape the aircraft by heading through North Pass and racing to the navy anchorage off Dublon. Carrier aircraft caught the *Oite* shortly after it cleared North Pass. An Avenger from USS *Bunker Hill* planted a torpedo amidships, a remarkable feat considering the *Oite* was moving in excess of 20 knots and maneuvering wildly. The hit shattered the old destroyer. It broke in two, and sank almost instantly. The 523 *Agano* survivors, packed below decks, never had a chance. They died to a man, as did all but 20 of the *Oite*'s crew of 172.

This plate shows the moment when the *Oite* was struck by the torpedo, shortly after clearing North Pass and entering Truk Lagoon. The ship can be seen avoiding a torpedo running parallel to it on the far side as another torpedo hits it broadside. Two Hellcat fighters are seen ahead of the *Oite*, after completing a strafing run on the destroyer.

The *Oite*'s wreck was found in 1986. It is broken in two sections, with the stern upright and the bow section capsized, the bridge buried in the sea bottom. Two hundred feet below the surface, it is a popular diving target.

Nor was the seaplane base at Dublon overlooked. A burning Aichi E13A is shown. Other aircraft on the Dublon apron include a second Aichi E13A and three biplane Mitsubishi F1Ms. (AC)

by *Yorktown* SBD Dauntlesses east of Uman. It stayed afloat, but sank the next day. *Enterprise* Dauntlesses and Avengers bombed and torpedoed the auxiliary cruiser *Kiyosumi Maru* while it lay in the repair anchorage at Fefan. Avengers from the *Enterprise* torpedoed and sank the destroyer *Fumizuki*, steaming at 27 knots for the open ocean. The destroyer *Oite* was caught by bombs and torpedoes after it entered North Pass and sunk. The auxiliary cruiser *Akagi Maru* successfully exited the lagoon through North Pass, only to be caught by Avengers outside the lagoon and sunk. The auxiliary cruiser *Aikoku Maru*, loaded with ammunition, took a direct hit from a bomb and evaporated in an explosion that engulfed the Avenger that hit it. US aircraft sank more than 20 ships during the daylight hours of February 17.

Five ships that managed to escape the lagoon sailed into a US battle line made up of the battleships *New Jersey* and *Iowa*, the heavy cruisers *Minneapolis* and *New Orleans*, and four destroyers. Admiral Ray Spruance, in overall charge of the Operation *Hailstone* task force, detached these ships at 0923hrs, sending them on an around-the-atoll cruise to catch escaping ships. At around 1330hrs, they encountered the light cruiser *Katori*, the destroyers *Makaze* and *Nowaki*, and a small trawler, the *Shonan Maru*. Three of the four were quickly sunk in the uneven surface combat that followed. The *Nowaki*, probably with the safety valves of its boilers tied down, managed to outrun the US ships, firing a spread of torpedoes to discourage close pursuit. Forty-five minutes later, the US warships caught the Japanese sub-chaser *SC-24* and quickly dispatched it.

The Japanese got a small measure of revenge on the night of February 17–18; a very small measure. Param airfield was able to launch a small airstrike of single-engine torpedo bombers against the US task force. These were radar-equipped B5Ns, able to track ships in the dark. Six or seven were sent out, searching to the northeast for the US carriers. They were spotted on radar as they approached the US ships. The task force maneuvered to avoid the incoming bombers, which would have worked if the Japanese were using aircraft blindly flying a standard search pattern. However, the radar-equipped Nakajimas detected the course change and continued to home in on the carriers.

Between 1900hrs and 2200hrs, the aircraft made several approaches to the US ships, but were kept at a distance by heavy radar-directed antiaircraft fire. The US began adding night fighters to carrier air groups in January 1944. Four of Task Force 58's carriers had a four-aircraft flight of night fighters aboard during Operation *Hailstone*. The *Yorktown* launched a night fighter F4U Corsair at 2120hrs to intercept a particularly persistent Nakajima, vectoring the fighter towards the torpedo bomber.

For once, the Japanese used radar to better advantage than the US: the Corsair never made contact with the Nakajima. The Nakajima was able to press its attack, launching a torpedo at the *Intrepid*. It struck near the starboard quarter, jamming the rudder, killing 11 aboard, and wounding 17. Mitscher detached the *Intrepid*, sending it to Eniwetok, where it would be covered by the US invasion fleet. Escorting the *Intrepid* were the light carrier *Cabot*, two cruisers, and four destroyers.

The US then launched its own night attack on Japanese shipping in Truk Atoll. Twelve radar-equipped Avengers launched from the *Enterprise* between midnight and 0200hrs on February 18. The crews had developed a technique to make radar-guided night attacks. Armed with four 500lb bombs, the Avenger pilots practiced low-level approaches at night, using radar to maintain altitude and track a target.

The bombers rendezvoused using running lights and Aldis lamps, and then flew into Truk Atoll, dousing all lights as they reached the outer reef. They had a last-quarter moon and half-overcast skies to help them. Attacking at one-minute intervals, they attacked targets in the Dublon and Eten anchorages. Using radar and flying at 180 knots at mast-top height, they made careful and individual runs on targets.

The Japanese knew there were US aircraft in the lagoon; they could hear the Avengers. A Japanese hospital ship switched on its lights (as required by international law) when the Avengers entered the lagoon. Heavy but inaccurate antiaircraft fire began. Except when an aircraft exhaust was spotted, the Japanese were firing blindly. Exhausts were typically spotted after the airplane passed the target and the bomb had already been dropped.

The Avengers made 25 passes during 30 minutes. When it was over, they had scored 13 direct hits on ships, two on rocky islets mistaken for ships (it was just as hard for the US pilots to see what they were shooting at as it was for the Japanese gunners), and seven near misses. Somewhere between 11 and 13 ships were sunk during the attacks, including the submarine tender *Heian Maru*, which had been damaged earlier and was anchored off Dublon to offload its stocks of torpedoes. All 12 Avengers returned safely to the *Enterprise*. It was a remarkable performance by a dozen aircraft in the US Navy's first carrier-launched night attack.

The real focus of Operation *Hailstone* was the ships in Truk Lagoon. The shore installations were not leaving, but the ships could. One ship is pictured exploding and burning near Fefen after being struck by US Navy bombs. (AC)

In all, US Navy aircraft sank around 20 ships during the daylight hours of February 17. Several are seen under attack and damaged in this photo, which captures the area between Dublon and Fefen. (AC)

But the United States was not done. Mitscher started the day with two fewer aircraft carriers than he had on the 17th due to the damage to the *Intrepid* and the dispatch of the *Cabot* to provide air cover to the damaged *Intrepid*. However, he did not withdraw. Instead, he launched another morning of airstrikes.

The day opened with another fighter sweep at dawn, intended to flush out any remaining Japanese fighters. It failed to do so, as not one Japanese fighter rose from Truk's airfields to challenge the Hellcats. Indeed, there were no airworthy Japanese fighters left following the previous day's sweep and the subsequent air combat. The United States owned the skies over Truk. Their only opposition was the remaining, largely land-based, antiaircraft guns.

Part of the morning was spent sinking cripples in the harbor. It soon became obvious that expending bombs on burning ships that were still afloat, but either sinking or too badly damaged to leave their anchorage, was a waste of resources. The carrier aircraft then turned their attention to shore installations.

The airfields were revisited. Two more hangars on Moen were flattened, attacks on Param rendered the airfield inoperable for the next 20 days and Eten's fuel storage facilities were destroyed. The fuel tanks at Dublon were also destroyed, and several of its ammunition dumps were hit. Radio, radar, and radio-direction facilities were degraded. By noon, Japanese resistance was almost non-existent. Lacking worthwhile targets, Spruance and Mitscher called a halt to the attacks. Truk no longer posed a threat to the Eniwetok invasion. Task Force 58 then turned north to Eniwetok to lend its support to that effort.

US losses were trivial. Twelve fighters, seven torpedo bombers, six dive bombers, and two floatplanes came down; of these, ten were lost in accidents. Of the nearly 50 aircrew in downed aircraft, 20 were rescued by floatplanes or submarines. Only 29 died. These losses and the damage to the *Intrepid*, with its 28 casualties, were the total losses suffered by the United States in Operation *Hailstone*.

According to the Joint Army-Navy Assessment Committee's postwar assessment, ten Japanese warships and 30 transports in Truk were sunk. They included five tankers. A total of 137,000 tons of Japanese merchant shipping was lost, of which 44,000 tons came from Japan's tanker fleets. Some of the ships in the harbor escaped. In addition to

the *Nowaki*, the destroyer *Akikaze*, although damaged, made it to Palau, escorting the repair ship *Akashi*, damaged during Operation *Hailstone* and only capable of making 12 knots. The seaplane tender *Akitsyshima*, hit by two 1,000lb bombs on February 17, but remaining afloat, also reached Palau. The hospital ship *Hikawa Maru* was untouched and it too made it to Palau.

That mattered little. Truk Lagoon had been exposed as a trap for Japanese ships. The Combined Fleet had already departed, and would never return. The Fourth Fleet headquarters remained at Truk, but its ships left. Any cargo ships at Truk unloaded and left as soon as possible. The transports carrying the 52nd Division to Truk, some of which arrived on February 19, hastily unloaded and quickly departed. A few cargo ships remained long enough to transfer small outlying Caroline Island garrisons to Truk to defend it against a US invasion that was presumed imminent, but Truk Lagoon was empty of large ships after March.

Truk was down, but not yet out. Its airfields were still usable – once they were repaired – but there were few flyable aircraft remaining, and few spare parts (except for what could be salvaged from wrecked aircraft). Repairing the airfields' runways and taxiways was complicated by their low elevation; craters tended to fill with water seepage at high tide. While the repair shops had been bypassed in this attack, the shortage of mechanics and fitters slowed repairs. No aircraft ferries or carries were planned to visit again. Replacement aircraft now had to be flown in. But Truk still had a formidable land garrison, and the potential to rebuild its air garrison, if it were left alone.

The Empire strikes back, February 17, 1944

The Imperial Japanese Navy got some measure of revenge for the US Navy's first day at Truk during the night of February 17–18. While Truk's night fighters lacked air search radar, in February 1944 its air garrison included a number of Nakajima B5N torpedo bombers equipped with ground search radar. After sunset on February 17, six or seven of these radar-equipped aircraft, codenamed Kate by the United States Navy, were launched from Param Airfield, Truk's bomber field.

Each B5N was armed with a torpedo. The 45cm diameter Japanese aerial torpedoes were smaller than the famous 61cm "Long Lance" torpedoes carried on surface warships. They were deadly ship-killers regardless of that. They had sunk the British battleship *Prince of Wales* and battlecruiser *Repulse*, and contributed to the sinking of three US aircraft carriers: the *Lexington*, *Yorktown*, and *Hornet*.

Airborne radar was new to Imperial Navy aircraft. The Truk-based B5Ns were probably equipped with Air Mark 6 units. The Mark 6 radar had been introduced in late 1942, and reached operational status in 1943. The radar had a range of 100km (54nmi), and used Yagi-type antennae.

Due to their radar, these aircraft were able to find the US fleet, despite the dark on a moonless night. The aircraft operated individually and independently. The first attack came at 1913hrs, two hours after sunset. They continued intermittently over the next three hours, although without result.

Finally, at around 2200hrs, a lone B5N picked up Task Group 58.2, which contained the fleet carriers *Essex* and *Intrepid*, and light carrier *Cabot*. Picking up the nearest of the two large carriers, the Kate's pilot made an attack on the *Intrepid*. Although the ships of the task group attempted to shoot down the torpedo bomber using radar guidance, they failed to down it before it dropped its torpedo. The *Intrepid* turned, attempting to run parallel to the torpedo's track.

The attempt almost succeeded in evading the torpedo. Almost. The torpedo struck the *Intrepid*'s stern, just ahead of and to the right of the rudder. The blast killed 11 crew, wounded another 17, flooded several compartments, and jammed the *Intrepid*'s rudder. It also took the *Intrepid* out of the battle. Escorted by the *Cabot*, two cruisers, and four destroyers, the *Intrepid* withdrew to Eniwetok. It could only make 20 knots as its jammed rudder forced it to steer by engines.

The B5N that dropped the torpedo apparently escaped unharmed.

This plate shows the B5N that dropped the torpedo that struck the *Intrepid* at the instant when the torpedo strikes. The aircraft has cleared the ring of defensive ships around Task Group 58.2, and is climbing into the darkness. The aircraft's radar antennae can be seen clearly – four T-shaped antennae on the leading edge of each wing near the fuselage and four off each side of the fuselage on the fuselage aft of the cockpit, between the wing and horizontal stabilizer.

In the background, the shape of the *Intrepid* is visible, framed by the plume created by the torpedo when it struck the aircraft carrier's stern.

Task Force 58 had been sent to New Guinea to attack Japanese airfields around Hollandia as invasion preparation, as shown here. When they passed near Truk returning from New Guinea to their Majuro anchorage, Nimitz decided to use the opportunity to further reduce Truk. (USNHHC)

April showers: April 1944

Operation *Hailstone* answered the question of whether Truk could be neutralized by air power or whether it had to be occupied. Two days of carrier strikes had rendered Truk incapable of defending itself, or of supporting Rabaul. There was no need for a costly invasion. In March, Truk's planned invasion was cancelled. Those resources would be committed to the Marianas landing scheduled in June. The Army Air Force followed up with raids, starting on March 15.

Army forces under the command of General Douglas MacArthur were due to invade the Hollandia region of New Guinea in March. MacArthur was concerned about Japanese naval and air threats to the invasion. Spruance's fast carrier task force raided the Combined Fleet's anchorage at Palau and airfields at Yap and Woleai in late March, reprising the February raids at Truk. It was due to support the Army invasion of Hollandia with carrier raids on New Guinea in mid-April.

Task Force 58 was still divided into three carrier task groups, but the task groups had grown from three to four carriers in each. Task Group 58.1 now consisted of the fleet carrier *Hornet* and light carriers *Belleau Wood*, *Cowpens*, and *Bataan*. Task Group 58.2 had two fleet carriers, the *Bunker Hill* and *Yorktown*, and two light carriers, the *Monterey* and *Cabot*. Task Group 58.3 comprised the fleet carriers *Enterprise* and *Lexington*, paired with the light carriers *Langley* and *Princeton*.

The task force carriers had over 650 aircraft aboard. They were accompanied by a heavy escort: six fast battleships, nine heavy cruisers, nine light cruisers, and nearly 40 destroyers. Not only were there more aircraft and a more powerful antiaircraft artillery screen available to protect the aircraft carriers, but there were also more night fighters. Each fleet carrier now had a flight of night fighter Corsairs, and several months' more experience in carrier night fighter operations.

Task Force 58 left Majuro on April 14 (East Longitude dates). It attacked airfields at Wakde, Sawar, and Sarmi on New Guinea between April 22 and 25. The raids were lightly opposed, the strongest opposition coming from antiaircraft fire. However, they accomplished little by way of supporting the Hollandia landings because there

were almost no Japanese aircraft at these New Guinea airfields. They had largely been destroyed by raids previously conducted by the US Seventh Air Force. US Navy carrier losses were trivial, which left Task Force 58 carriers with full air groups. In view of this, Nimitz decided to end that cruise by revisiting Truk and conducting surface bombardments of Japanese-held Satawan and Ponape on the way back to the Fifth Fleet's anchorage at Wotje.

Nimitz realized that while Operation *Hailstone* had knocked Truk down, it had not knocked it out. Truk had been abandoned by ships of the Imperial Japanese Navy, but its air garrison was being reinforced, largely by aircraft withdrawn from Rabaul in March. The initially unopposed Army Air Force raids were being met by increasingly large numbers of Japanese fighters in late March and early April.

Adding additional strikes during the return trip killed several birds with one cruise. Task Force 58 would be passing these islands to reach Majuro. A carrier attack on Truk eliminated any chance of Japanese aircraft from there interfering with Marianas operations. It would also reduce the air opposition faced by Army Air Force bombers attacking Truk, making it easier to keep Truk neutralized. The bombardment of Satawan by the Fifth Fleet's cruisers and that of Ponape by the Fifth's battleships allowed these ships to polish up their shore bombardment skills prior to the Marianas landings.

Orders were sent while Task Force 58 refueled at sea off Seealder Harbor in the Admiralties on April 28. This late-April Truk strike lacked the dignity of a name. Truk had been reduced from being the main attraction to a target of opportunity. Task Force 58 reached Truk shortly before dawn on April 30. The *Lexington* was back after repairs, visiting Truk for the first time, as were the light carriers *Cowpens*, *Bataan*, *Langley*, and *Princeton*. The remaining carriers were veterans of Operation *Hailstone*.

The second Truk raid concentrated on Japanese shore installations ignored in the February attacks. This included the radio direction-finding station on Ulalu, which Dauntless dive bombers are shown attacking. (USNHHC)

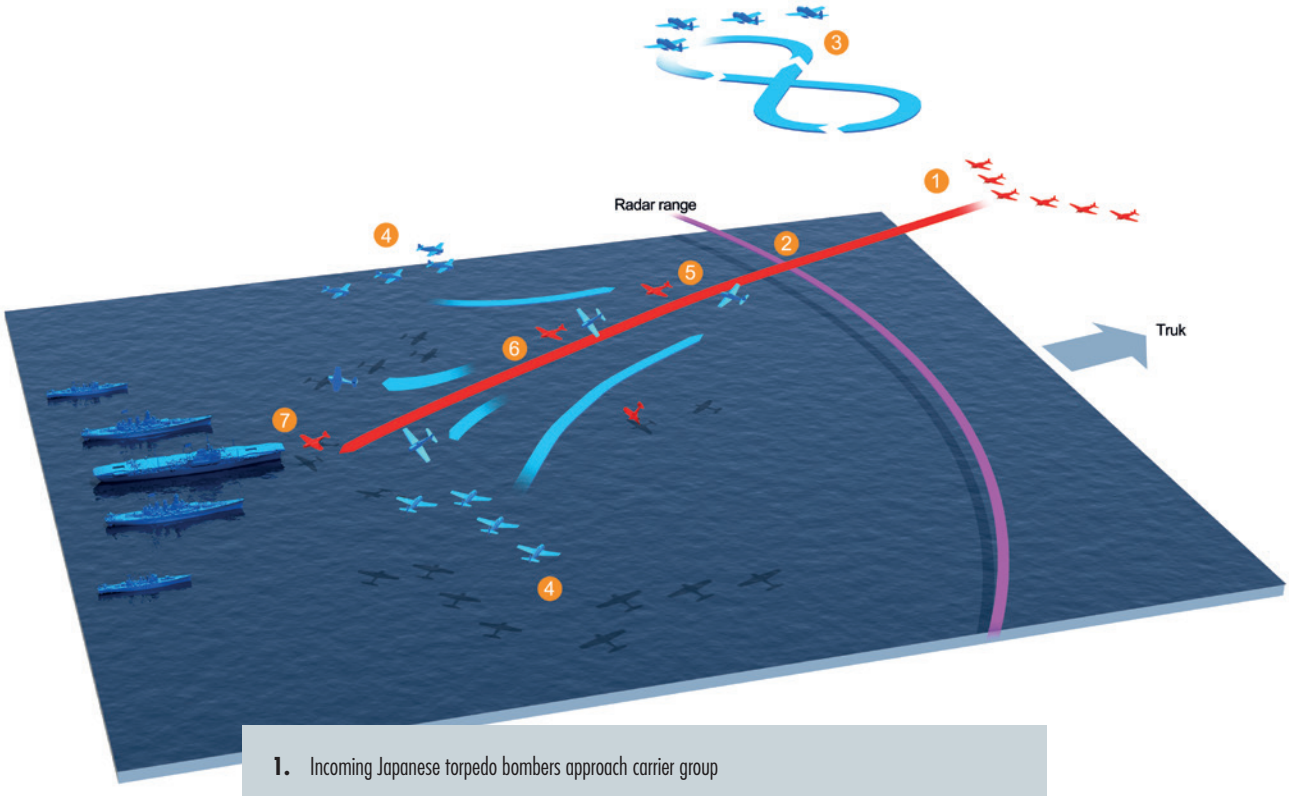
OPPOSITE COMBAT AIR PATROL

Truk's air garrison had grown enough to be a concern. By late March, 30 flyable A6M Zero fighters had been pieced together from aircraft destroyed during the February raids. Additionally, aircraft were being withdrawn from bypassed bases in the Marshalls and sent to Truk. By April, the Japanese had 104 flyable aircraft at Truk: six G4M twin-engine bombers, 12 D4Y1s dive bombers/reconnaissance bombers, 13 B5N or B6N torpedo bombers, 55 A6M fighters, ten J1N1 night fighters, and eight floatplanes used for observation and reconnaissance. Moen No 1 airfield housed the G4Ms and 20 A6Ms, while Eten had the rest of the A6Ms and all the night fighters. The single-engine bombers, the D4Y1s, B5Ns, and B6Ns, were all at Param, with the floatplanes at Dublon. There were another 63 unserviceable aircraft scattered throughout Truk's airfields.

The US raid opened in the same way as the last one, with a dawn fighter sweep. This time, 84 F6F Hellcats were sent, launching before sunrise to arrive over Truk's islands at daybreak at 0450hrs. This time, the Japanese were prepared. Five Nakajima bombers were aloft doing a dawn sweep, something that had become routine since February. While four of them found nothing, a fifth apparently spotted the US aircraft, because it broke radio silence but failed to complete the transmission. It also failed to return to base, presumably being shot down before reporting its discovery. Truk's radar detected the inbound US aircraft when they were 30 minutes out, shortly before the scout's interrupted radio report.

The warning gave the Japanese time to launch air cover. Before the US fighters arrived, Moen No 1 had scrambled 20 Zeros, Eten another 29, and Param its remaining Nakajima bombers. A total of 57 aircraft got aloft. Heavy cloud cover gave the Japanese aircraft places to hide, allowing them opportunities to surprise the US fighters. The scrambled bombers were armed with antiaircraft bombs, along with time-fused 30kg and 60kg aerial phosphorus bombs, intended to explode near a target aircraft. Truk's defenders had some success using these on B-24s, which flew in predictable formations, but they were less effective against fighters.

Dublon's seaplane base was attacked in the first round of carrier attacks on Truk. The second raid attacked its naval base. Smoke rises from warehouses and workshops hit during this raid. The burned-out fuel tanks were probably destroyed earlier during a March Army Air Force raid. (USNHHC)



1. Incoming Japanese torpedo bombers approach carrier group
2. Torpedo bombers reach radar range, US Carrier Group CIC begins tracking the bogies (unknown aircraft)
3. CIC orders high CAP (at 20,000 feet) to continue circling to guard against follow up attacks
4. CIC orders low CAP to intercept bogies and directs them to the incoming aircraft
5. Closer (of two) low CAP flight reaches bogies, identifies them as enemy aircraft (bandits) and attacks
6. More distant low CAP flight reaches bandits and attacks
7. Surviving torpedo bombers reach Carrier Task Group antiaircraft range. US fighters break off

Regardless, the Hellcats brushed aside the Japanese air opposition. Probably half of the Japanese fighters sent up in response went down that morning. Of the 84 F6Fs sent on the initial fighter sweep, only two were shot down. By the end of the two days of raids, 59 Japanese aircraft had been shot down by US fighters. Before returning to the carriers, the Hellcats strafed Truk's airfields.

Then it was the turn of the US bombers. As in February, Task Force 58 made staggered strikes throughout the day, with carriers launching full-deckload strikes. Groups of 18–36 aircraft set off at 30-minute intervals. Fighters, dive bombers, and torpedo bombers were over Truk virtually continuously for the rest of the day.

During the February raids, emphasis had been placed on Japanese shipping. This time, shore facilities were the goal. The Japanese had begun moving facilities underground after the February raids, but most supplies, workshops, and aircraft hangars were still above ground in their original frame buildings at the end of April. Special attention was given to the airfields, especially those on Moen and Eten. Hangars, maintenance buildings, workshops, and operations building at Truk's five airfields were flattened. Aircraft in revetments and aprons were strafed and bombed.

Raiders also visited the other facilities. Dublon, with its naval headquarters, administrative center, oil storage tanks, magazines, and maintenance shops, was hit hard. US aircraft worked over Fefen's docks warehouses and ammo dumps. Radar and communications centers throughout the islands were attacked, and the radio direction-finding station at Ulalu was flattened.

Nor were the remaining ships in Truk Lagoon ignored. The *Hino Maru No 2*, a 1,500-ton cargo ship and auxiliary gunboat, was hit and heavily damaged by a bomb by an Avenger from USS *Cabot* during the attack's first day. It sank four days later on May 4. The *Sapporo Maru*, a 600-ton auxiliary provision stores ship, was bombed on April 30 and sank north of Fefan. The 300-ton auxiliary minelayer *Minsei Maru* and 20 other craft were also destroyed in the harbor during the two days of raids. While a small haul when compared to February's results, these losses further reduced the number of vessels remaining in Truk Atoll. This increased the difficulty of moving supplies and personnel between the different islands in the lagoon, further decreasing Truk's usefulness as an outpost.

Additionally, the Japanese submarine I-174 was detected 20 miles south of the atoll on May 1. Aircraft from the light carrier *Monterey* teamed up with the destroyers *MacDonough* and *Stephen Potter* to sink the submarine. Whether the submarine was fleeing Truk or heading back to it after a patrol is not known. Its loss contributed to the decision to abandon Truk as a submarine base later in 1944.

The Japanese attempted to strike back on the morning of the raid's second day, with several straggling strikes made. The largest attack against the US fleet contained eight bombers, D4Y1 dive bombers, and Nakajima torpedo bombers which survived the first day's attack. They found Task Group 58.2 and Task Group 58.3 at 0815hrs, making a series of attacks against aircraft carriers in both groups. Met by heavy antiaircraft fire, they were shot down, most before they could drop their torpedoes or bombs. Only one came close enough to drop a bomb, which fell near the *Lexington* but caused no damage. Truk also sent aircraft in pursuit of the US fleet on the night of May 1/2 as Task Force 58 departed after finishing the second day of strikes. These merely trailed the retiring warships and did not attempt to press home a night attack on the force.

Based on interpretation of post-strike aerial photography, US intelligence estimated 40 percent of the buildings on Dublon, 80 percent of those on Eten, 75 percent of those at Moen, 20 percent of the buildings on Fefan, 15 percent of those on Param, and 80 percent at Ulalu were destroyed during the airstrikes of April 30 and May 1. In all, 423 buildings and six hangars were destroyed, and 44 others damaged.

In addition to the damage to facilities, the raid shredded Truk's air garrison. Of the 167 aircraft at Truk the day before Task Force 58's raid, only 12 were still flyable after the last US aircraft landed aboard its carrier at the end of May 1. US aircraft had shot down 59 and the fleet's antiaircraft artillery another half-dozen. A further 60 were destroyed on the ground, 34 during the first day of the attack. The remaining aircraft, a little over 40, were damaged and nonoperational. They could be repaired, but that would take time, especially with most of the maintenance facilities and repair shops in ruins. Most of these survivors were at Param, a bomber field which had been neglected in favor of hitting the fighter airfields at Moen and Eten. Regardless, the threat posed to the upcoming Marianas offensive had been eliminated by Task Force 58, while the number of Japanese fighters available to intercept B-24 raids had been reduced to almost zero.

Task Force 58 accomplished this with 2,200 bomber sorties, 467 of which were flown by fighters carrying bombs. In all, US Navy aircraft dropped 748 tons of bombs during the two-day operation.

In exchange, the United States lost 35 aircraft. Two were shot down during dogfights during the fighter sweep, 24 by antiaircraft fire while attacking shore installations, and

Air-sea rescue

The US Navy went to extraordinary lengths to protect and recover carrier aircrew shot down during operations against enemy-held islands. Aircrew were men whose skills took a long time to develop, and were critical to victory. Indifference to the lives of its aircrew was a key reason for the drop-off in quality of the Imperial Japanese Navy's Kido Butai between December 1941 and 1943.

The US Navy used two primary tools to preserve its airmen: lifeguard submarines and spotter aircraft. Lifeguard submarines were US Navy fleet submarines diverted from war patrols to rescue downed fliers. They did double duty, being allowed to sink enemy ships entering and leaving the island being attacked. Lifeguard submarines sank several ships during operations at Truk, most notably the light cruiser *Agano*, lost the day before the February air raids.

Spotter aircraft, Kingfisher floatplanes operating off US Navy battleships and cruisers, were originally intended to conduct aerial reconnaissance and gunnery spotting. These functions had been superseded by carrier aircraft and radar. Instead, they were used to rescue downed fliers. Slow and vulnerable to enemy fighters and even small-arms fire from ground troops, Kingfishers could only be used where the US had air superiority and out of gunfire range from enemy-held islands.

The United States Navy went to extraordinary lengths to recover downed aircrew. The Tang, the US Navy's top-scoring submarine in World War II, collected 22 survivors in April 1944. They are shown here along with the Tang's captain, Richard Kane (center), after the submarine reached Hawaii in May 1944. (USNHHC)

During the Truk raids, lifeguard submarines waited outside Truk Atoll in an assigned arc to ensure they avoided attacking each other. Before the February raids, Truk was ringed by ten submarines. Due to the almost impromptu nature of the second raid, fewer subs were available, most – like the Tang – hastily reassigned from war patrols. Pre-mission briefings informed US Navy aircrew where the submarines were waiting. Damaged aircraft unable to reach the carrier would attempt to ditch near a lifeguard, if they could make it beyond Truk Atoll. Submarines could not enter the lagoon due to minefields.

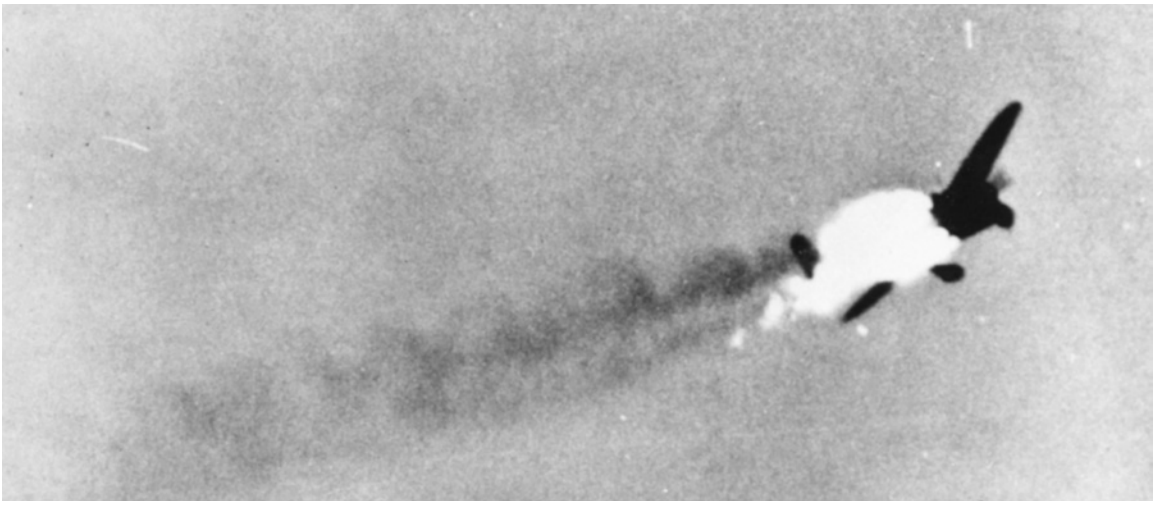
If the damaged aircraft was unable to reach a lifeguard submarine, floatplanes were dispatched to rescue the crew, even within the lagoon, especially if the downed aircraft was a one-man fighter. A floatplane could not take off with more than one extra passenger (sometimes two if water conditions were right). It had to taxi to a submarine to unload extra passengers from a downed Avenger.

Forty-eight downed Navy aircrew were rescued during the two sets of air raids, 20 in February and 28 in April. The most spectacular rescue during the February raid involved a fighter pilot shot down inside the lagoon. His rescue by a Kingfisher was contested by the Japanese destroyer *Fumizuki*. The ship was driven off by nine Hellcats, circling the Kingfisher, which strafed the *Fumizuki* until it let the Kingfisher depart.

During the second set of raids, the three-man crew of an Avenger shot down on April 30 was spotted the next morning in a raft inside the lagoon. A floatplane from the *North Carolina* picked up the men, but capsized in choppy waters. The *North Carolina* sent a second Kingfisher, which recovered all five survivors. Unable to take off, it took them aboard and taxied through the reef, towing the raft behind. Outside the reef, it rendezvoused with the waiting Tang. The Tang took the seven on board and sank the Kingfisher. The Tang rescued a total of 22 airmen on April 30 and May 1, a record that stood for over a year.

another nine due to accidents (these included two floatplanes). Another 33 aircraft had been damaged, mostly by antiaircraft fire, but made it back to their carriers safely. Only 18 airmen were killed. The remaining 28 were rescued after being shot down. There were no combat casualties among the crews aboard the ships participating in the raid.

This second carrier raid knocked Truk down and out. The Japanese rebuilt its air garrison in early May, but before the month ended Truk was ordered to send 71 aircraft – including 59 Zeros – to Yap and Guam. That left only a dozen or so operational aircraft at Truk,



The Japanese counterattacked with a daylight attack by a handful of Nakajima B6N torpedo bombers. This one was completely unsuccessful; no hits were scored, and most of the aircraft, including this one, were shot down, primarily by antiaircraft fire. (USNHHC)

occasionally reinforced by what new aircraft could be pieced together from spare parts of wrecked aircraft. Truk's usefulness as a supply base and airbase thus ended. Its garrison was abandoned. Its remaining mission was to bleed the Allies should they invade Truk – something the Allies had no intention of doing.

Truk besieged: March 1944–June 1945

The Army Air Force opened its aerial siege of Truk on March 15, 1944, with a night air raid on Eten and Dublon. It continued attacking Truk for the rest of the war. During that period, aircraft of the Seventh, Eleventh, Thirteenth, and Twentieth Air Forces sent aircraft to hit Truk. These raids ensured Truk remained reduced to insignificance. Truk was visited at least weekly by reconnaissance aircraft checking its status, to ensure it had not regained strength.

The first Army Air Force mission against Truk took place in the pre-dawn hours of March 15. Two squadrons from the Seventh Air Force's 30th Bombardment Group left their bases in the Gilbert Islands, landing at Kwajalein to top up their fuel and load bombs. At 2200hrs on March 14, 22 B-24s took off from Kwajalein, each loaded with six 500lb general purpose bombs armed with delayed fuses. Weather and mechanical problems forced nine Liberators to turn back, although four of these bombed alternate targets. The rest reached Truk, aided by the Japanese; broadcasts from Truk allowed B-24 navigators to ride the radio beams to the target, arriving around 0300hrs.

The Japanese were not expecting an attack. Eten and Dublon, targets for the first attack, were illuminated, the lights doused only after bombs started dropping. One flight of bombers hit the airfield at Eten. A second flight hit the seaplane base, while another dropped bombs in the warehouse section of Dublon town. The rest of the aircraft bombed Dublon's tank farm. All the Liberators returned home safely, although one had to detour to Eniwetok after losing two engines. While successful, the mission required a 3,700-mile round trip. Further missions were postponed until the B-24 squadrons could transfer to Kwajalein and Eniwetok had been improved enough to serve as a staging airfield.

The next raid on Truk did not take place until March 28. It followed an unsuccessful attempt to bomb Truk on March 26 by the Thirteenth Air Force. That mission, launched from the Solomons, was so ill-planned that the B-24s missed Truk by 70 miles and were forced to return due to fuel limitations. The Seventh Air Force, now established at Kwajalein, sent 32 bombers to Truk on March 28. Twenty-eight of the bombers reached Truk at

2100hrs, attempting to bomb airfields at Moen and Eten. Cloud cover obscured the targets, and accuracy was poor. Truk was blacked-out and antiaircraft fire was heavier, but again all planes returned safely to Kwajalein.

The first daylight attack on Truk took place the following day. Twenty-four bombers from the 307th Group, Thirteenth Air Force, took off from Munda, staged through Torokina to load bombs, and refueled at Nissan before heading to Truk. Twenty aircraft made it to the target. They were met outside Truk by 80 or so Japanese aircraft, both D4Y1s loaded with phosphorous bombs and Zero fighters. Flying in formation at 17,000–19,000ft, they came under intense antiaircraft fire from shore-based batteries and three destroyers in Truk Lagoon. After the bombers dropped their loads of 100lb and 500lb bombs, they were swarmed by Japanese fighters. A running fight ensued. At least 75 fighters attacked the formation, while other aircraft dropped phosphorus bombs on it. US gunners claimed 31 enemy aircraft shot down, 12 probable kills, and ten damaged. The actual casualties were most likely much lower, perhaps just ten shot down. Post-mission photo analysis showed 49 aircraft destroyed on the ground at Eten. Two B-24s were lost, one going down after leaving Truk and a second flipping when it landed.

The next day, March 30, the Thirteenth Air Force launched another daytime raid on Truk. This time, 11 of 19 B-24s sent from the Solomons struck Moen Airfield. They were again met by heavy resistance from perhaps as many as 50 fighters. B-24 gunners claimed 18 kills, but three of the bombers were lost. The Thirteenth Air Force made a third daylight raid on April 2, hitting Dublon town with two dozen B-24s. Over 50 Japanese aircraft attacked the formation ten minutes out of Dublon, attempting to break up the formation, and kept up the attack for half an hour after the bombs were dropped. Another 39 Japanese aircraft were claimed as kills, and bombing was good, but four B-24s were lost. These losses deterred additional daylight strikes on Truk until after the carrier raids at the end of April.

The Army Air Force began its campaign against Truk on March 15, 1944. Raids continued nearly daily throughout June and continued thereafter. These bombers are pictured over Dublon during one of the many daylight raids. (USAF)

The Army Air Force raids required B-24s, operating from primitive airfields hastily carved out on tropical atolls, to make long over-ocean flights to reach Truk. The closest Allied base, at Eniwetok, was 680nmi from Truk. Kwajalein and Bougainville were even further away. (AC)

But Truk was not left alone. Both the Seventh and Thirteenth Air Forces conducted nighttime attacks on Truk virtually daily throughout April. Sometimes these were "heckler" missions, with one or two B-24s loaded with magnesium clusters and fragmentation bombs intended to harass the garrison and interrupt sleep. Many were larger; one and two squadron missions. The largest strike took place on April 6/7, when 27 B-24s hit Dublon. The primary targets for these raids were airfields on Moen and Eten, Dublon town, and the Dublon Seaplane Base. In April, Eniwetok-based PB4Ys also mined the major entrances to Truk Lagoon, making it dangerous for the Japanese to send ships to Truk.

Night fighters, antiaircraft fire, and the hazards of lengthy over-water flying took its toll. Typically, one or two bombers sent out in these large raids failed to return the following morning. Yet the raids were doing damage: over 50 percent of Dublon town was destroyed prior to the second carrier strike (which flattened 40 percent of what was still standing). The airfields had also been hit hard, with the Army Air Force claiming to have destroyed 137 Japanese aircraft on the ground and in the air.

The air claims were almost certainly overstated. In actuality, when the Army Air Force began attacking Truk, there were 161 aircraft on Truk, of which over 100 were fighters. By the end of April, that total was down to 104. While some additional reinforcement aircraft were sent to Truk, and damaged aircraft counted as destroyed may have been repaired, it

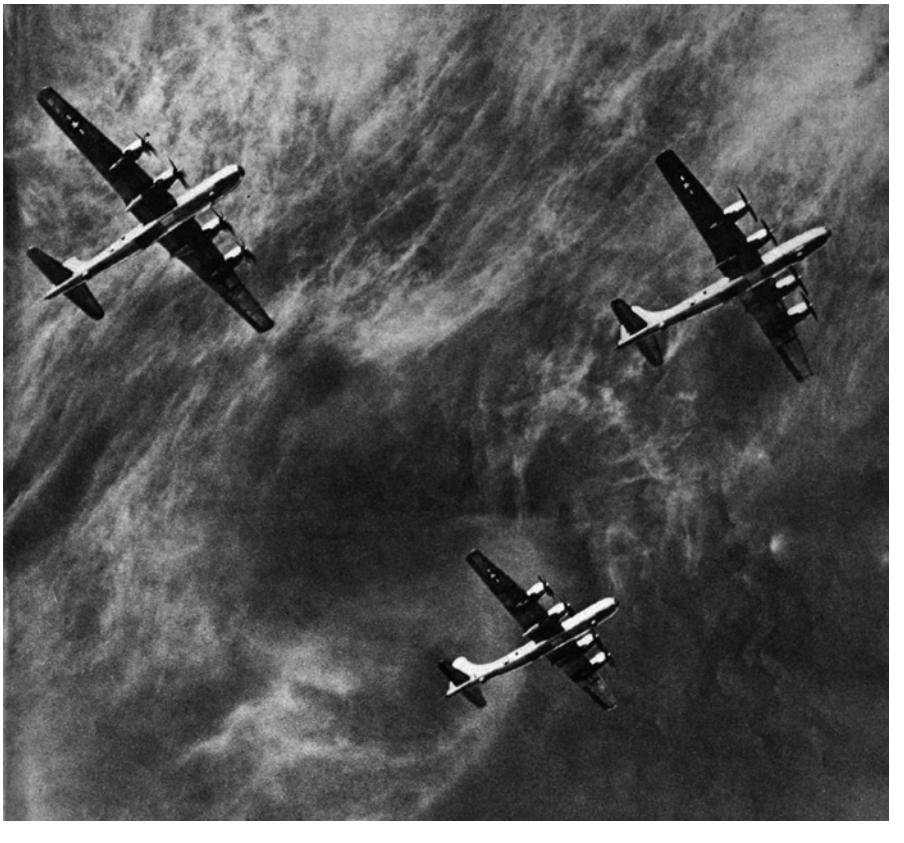
is unlikely these reinforcements totaled 80-plus aircraft. Postwar interrogations of Truk's garrison suggested that fewer than 25 Truk fighters were shot down by gunners on Army Air Force bombers.

The Army Air Force followed up Task Force 58's second attack on Truk with two weeks of intense bombing using two bomb groups. Between May 2 and 13, the US Seventh Air Force attacked Truk six times, staging aircraft through Eniwetok and Kwajalein to make night raids. By then, one bomb group was stationed at Kwajalein, shortening the overall flying time.

There was a brief lull for the rest of the month. The heavy bombers of the Seventh Air Force turned their attention to the Marianas, launching raids prior to the landing there scheduled for early June. The Thirteenth Air Force turned its attention to other islands in the Carolines, east of Truk. The Japanese used the respite to send more aircraft to Truk, which probably held around 130 aircraft, including 80 Zeros, by the end of April.

That number plunged to 60 by the end of May, but not due to enemy action. Rather, aircraft had been ordered out of Truk, being sent to other places. The invasion of the Marianas left the air garrison still smaller. At the end of June, it numbered only 35 aircraft. Eight of these were new fighters, sent from Palau. The rest had been cobbled together from bits and pieces of damaged aircraft. Spare parts and engines were in short supply, and only six or seven aircraft were operational at any one time after that.

In the run-up to and after the invasion of Saipan, the Seventh and Thirteenth Air Forces again turned their attention to Truk. This time the intention was to ensure Truk could not be used as a base to oppose the invasion. Starting on May 30, and continuing virtually daily throughout June, the Seventh Air Force targeted Truk, launching B-24s from both Eniwetok and Kwajalein. They were joined by the Thirteenth Air Force, which launched five strikes in



The B-29 joined the siege of Truk in October 1944. While Truk had been neutralized, the B-29 raids offered the pilots and crews of the Twentieth Air Force valuable operational and combat experience before attacking the Japanese Home Islands. (AC)

six days between June 6 and 11. On days when both air forces attacked Truk, one (typically the Thirteenth) attacked during daylight hours while the other made a nighttime raid. Some of these strikes were significantly larger than earlier raids, ranging from 39 to as many as 56 B-24s.

By the end of June, Truk had been effectively neutralized. There was nothing left to destroy, and new raids were merely making smaller bits of rubble from larger ones. However, Truk was too close to Guam, which would soon be home to B-29 Superfortresses intended to bomb Japan, to tolerate any possibility that it might offer a threat. The Japanese staged attacks on Saipan through Iwo Jima, and the Army Air Force wished to ensure raids on Guam were not staged through Truk. The Army Air Force continued pounding Truk throughout July, August, and September. By then, most of Truk's above-ground installations were rubble. Most of this period's raids concentrated on "post-holing" the runways of Truk's airfields, cratering them to make them unusable. It was an ongoing process: the US would crater the runways, the Japanese would fill in the holes, and after the Japanese had finished the US would revisit the airfield and knock more holes in the runways. The Eleventh Air Force ceased missions against Truk on August 15, 1944, but the Seventh Air Force continued hitting Truk.

Raiding Truk was not totally meaningless to the Army Air Force, as it became a place to introduce new units to combat. The Japanese managed to keep a few fighters flying and resisted attacks with antiaircraft fire; enough to keep attacking aircraft alert, but not enough to pose a serious danger to crews. That gave new units an opportunity to gain combat experience at relatively low risk. At the same time, raids kept Truk neutralized, which was necessary, but low-priority by the summer of 1944.

The most significant of these training raids were four attacks mounted between October 28 and November 9, 1944. These were among six training missions conducted by the Twentieth Air Force, two of which were made against Iwo Jima. The Twentieth Air Force was flying B-29 Superfortresses. The first B-29 arrived at Isley Field at Saipan on October 12, 1944. Its ultimate mission was to flatten the Japanese Home Islands. The Twentieth wanted to wait until it had at least 100 operational aircraft before sending the new planes against Japan. Twentieth Air Force Command wanted to try out the B-29 in combat, though, as the aircraft was new, virtually experimental.

Truk was believed to be a perfect warm-up for the main act. It required a lengthy over-water flight of 550nmi, less than half the distance of a flight to Tokyo, but long enough to practice formation flying against a combat target. Truk was weak enough that a small, inexperienced formation was likely to survive intact, which was not the case if flown against Japan. It would be a good test of crew preparedness and bombing accuracy.

The first mission took off on October 28. Eighteen aircraft left Isley Field, but four had mechanical problems and had to return, including the aircraft flown by the commander of the Twenty-First Bomber Command, Heywood Hansell. The target was the submarine base at Dublon. Bombing accuracy was very poor, which mattered little; the base was unused. The Sixth Submarine Flotilla which had operated out of it had been dissolved in September. The bombers attracted the attention of one Zero, which prudently stayed out of range of the bombers' guns. Yet the mission was a success in that it was the first combat use of B-29s out of the Marianas.

Three more practice missions were made on October 30, November 2, and November 11, with eight, seventeen, and eight B-29s respectively taking part. The submarine base was the target on all three occasions. In the last mission, the Superfortresses were escorted by P-38 Lightnings, the first time Army bombers received an escort to Truk. B-29s continued using Truk for practice missions until June 1945, including a 30-plane strike against Moen No 1 airfield on January 21. In all, Twentieth Air Force flew 32 missions against Truk. After the first six, bombing accuracy was rated as excellent. The most important practice missions were flown by the 509th Composite Squadron, the unit tasked with dropping the atomic bomb. On these missions, crews practiced the bomb run procedure with conventional bombs

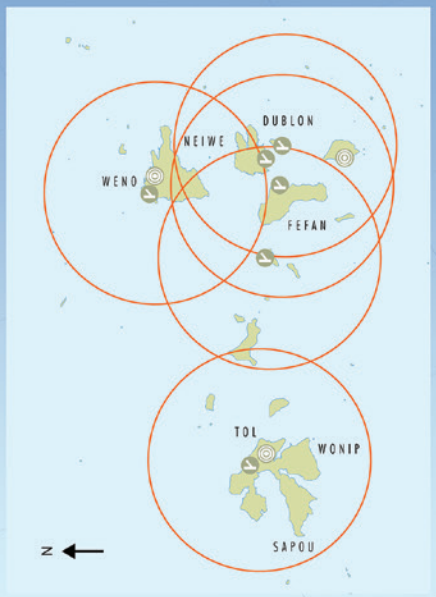
The P-47N had a combat radius of 1,000nmi. The 318th Fighter Group on Saipan received P-47Ns in late 1944, and began conducting fighter sweeps over Truk in January 1945. (AC)

rather than conventionally armed "pumpkins" (as the casings for the atomic bombs were nicknamed). Practice made perfect, leading to two successful atomic attacks on Japan in August 1945.

The Japanese largely abandoned Truk as an air base after the fall of the Marianas. Instead, attention turned to transforming Truk into a citadel against amphibious invasion. The Japanese Fourth Fleet's responsibility, which once included all of the Marianas, Carolines, and Marshalls, was reduced to just Truk Atoll. Its air garrison became the grandiosely titled East Carolines Naval Air Corps in the fall of 1944. It had nearly 2,000 officers and men, but only a half-dozen operating aircraft. Submarines abandoned Truk after the summer of 1944. By the fall, its garrison had moved underground, as had its surviving facilities. Without aircraft or ships to service, except for small torpedo boats hidden against the day of invasion, they largely had no function.

The only relevant part of the garrison were its troops, the number of which had swollen from a few hundred in January 1944 to 14,300 by the end of April. With the 20,000-man naval garrison, that made Truk home to 34,000 men. By comparison, Kwajalein held 8,000 men, Tarawa some 4,800 troops, and Eniwetok only 1,000 when it was invaded. In August 1944, Truk's garrison was reorganized into the Thirty-first Army. Its Army garrison continued growing, as garrisons from Mortlock and Enderby Island were withdrawn to Truk between September 1944 and January 1945. However, had the US invaded, garrisons on each island would have been on their own. There was no plan to transfer reinforcements between islands, and no ships available for such transfers. Regardless, there was no US plan to invade Truk, rendering Japanese invasion preparations meaningless.

Nevertheless, the US kept attacking Truk. A report that a Kawanishi H8K (a four-engine flying boat that replaced the H6K later in the war) was sighted at the Dublon in April 1945 led to a month-long series of intense raids. Not only bombers were sent. Long-range P-47Ns Thunderbolts arrived at Saipan in early 1945. In addition to their eight .50cal machine

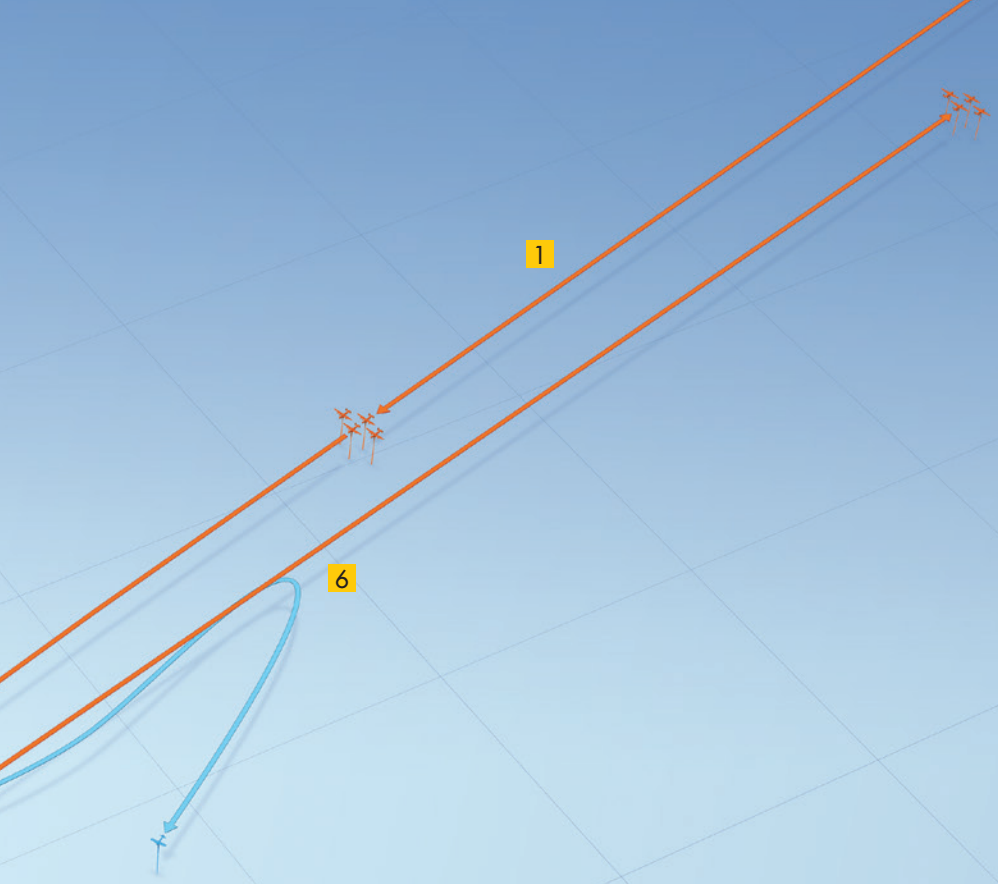


Japanese Forces

902nd Naval Air Corps (at Moen)
22nd Air Flotilla (at Eten)

USAAF Units

307th BG (11 B-24s)



March winds blow hard

The B-24 raid, March 30, 1944

EVENTS

1. 1240hrs: Truk radar detects incoming B-24s
2. 1250hrs: Japanese fighters scramble from Moen and Eten
3. 1250–1315hrs: Japanese fighters assemble over strait between Moen and Dublon
4. 1320hrs: Bombers enter final approach to target, Japanese fighters attack
5. 1330hrs: B-24s bomb Moen No.1 airfield, begin return to US bases
6. 1400hrs: Japanese aircraft break off attack

guns, these aircraft carried eight 4½in rockets. They accompanied B-24 raids and conducted independent fighter-bomber sweeps, attacking installations difficult to spot except at very low altitudes, such as radio stations and radar antennae.

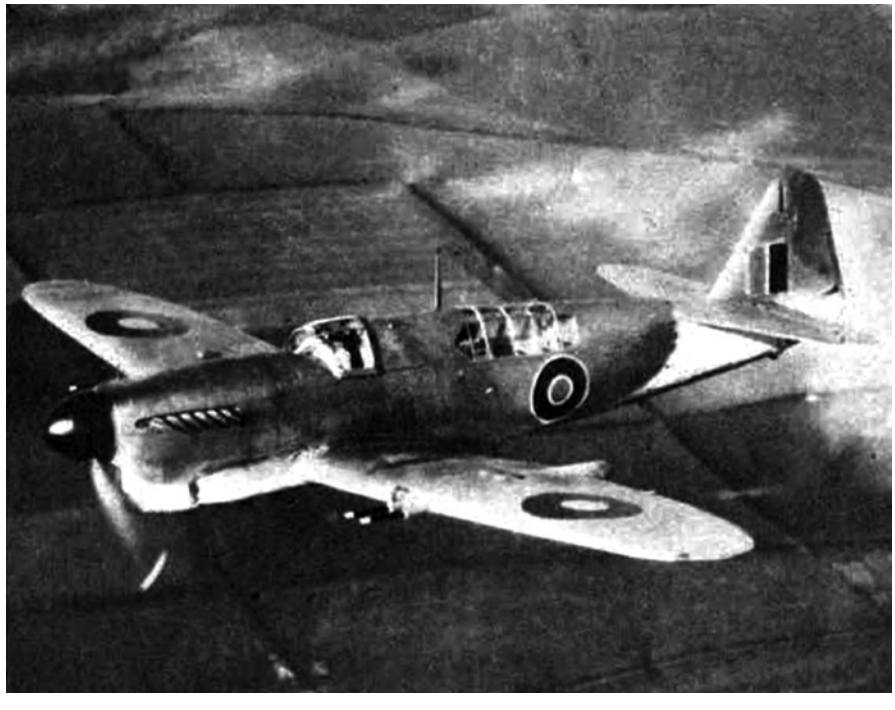
Operation *Inmate*: June 14–15, 1945

The final carrier raid on Truk was unusual in several ways. Firstly, the ships and aircraft did not belong to the United States Navy: they were Commonwealth ships. It was a Royal Navy task force, built around a Royal Navy aircraft carrier with ships of the Royal New Zealand and Royal Canadian Navies providing part of the escort. Furthermore, the force was not attacking Truk because a new threat had emerged from that isolated atoll. Rather, it was an opportunity to polish up carrier operations skills before moving into an intense combat environment.

Sent to the Pacific in early 1945, the British Pacific Fleet marked the Royal Navy's commitment to the Pacific War. With the demise of Nazi Germany nearing at the end of 1944, a Royal Navy fleet built around Britain's newest battleships and aircraft carriers was formed. By the early spring of 1945, it was operating out of Manus in the Admiralties. It supported the invasion of Okinawa in March and April 1945. At that time, it consisted of four fleet carriers and two King George V-class battleships.

HMS *Implacable* remained in Britain, undergoing a refit which lasted until March 1945. It was then sent to the British Pacific Fleet, arriving in Sydney, Australia, in early May. It then proceeded to the British base at Manus, arriving at the end of May. Meanwhile, the British Pacific Fleet was released from its Ryukyu operations on May 25, returning to Sydney for rest, resupply, repairs, and refitting. One battleship was detached for a refit. The *Implacable*'s sister ship, HMS *Indefatigable*, also needed a refit, while the Formidable-class *Illustrious* had suffered combat damage and was being sent to Britain for dockyard repairs. This reduced the British Pacific Fleet to two fleet carriers and one battleship. The British Pacific Fleet badly needed HMS *Implacable*, and not just to replace the two unavailable aircraft carriers.

The *Implacable* had the largest air group carried by any aircraft carrier in the British Pacific



The Fairey Firefly was a replacement for the two-seat Fairey Fulmar fighter-reconnaissance airplane. Although mediocre as an air superiority aircraft, the Firefly made an excellent ground attack and antisubmarine airplane, and a useful reconnaissance aircraft. (AC)

The Seafire was the Fleet Air Arm's primary air superiority fighter. It excelled at intercepting kamikazes in the Pacific, but possessed a short range. Its 20mm cannon made it effective as a ground attack aircraft. The *Implacable* carried 48 Seafires. (AC)

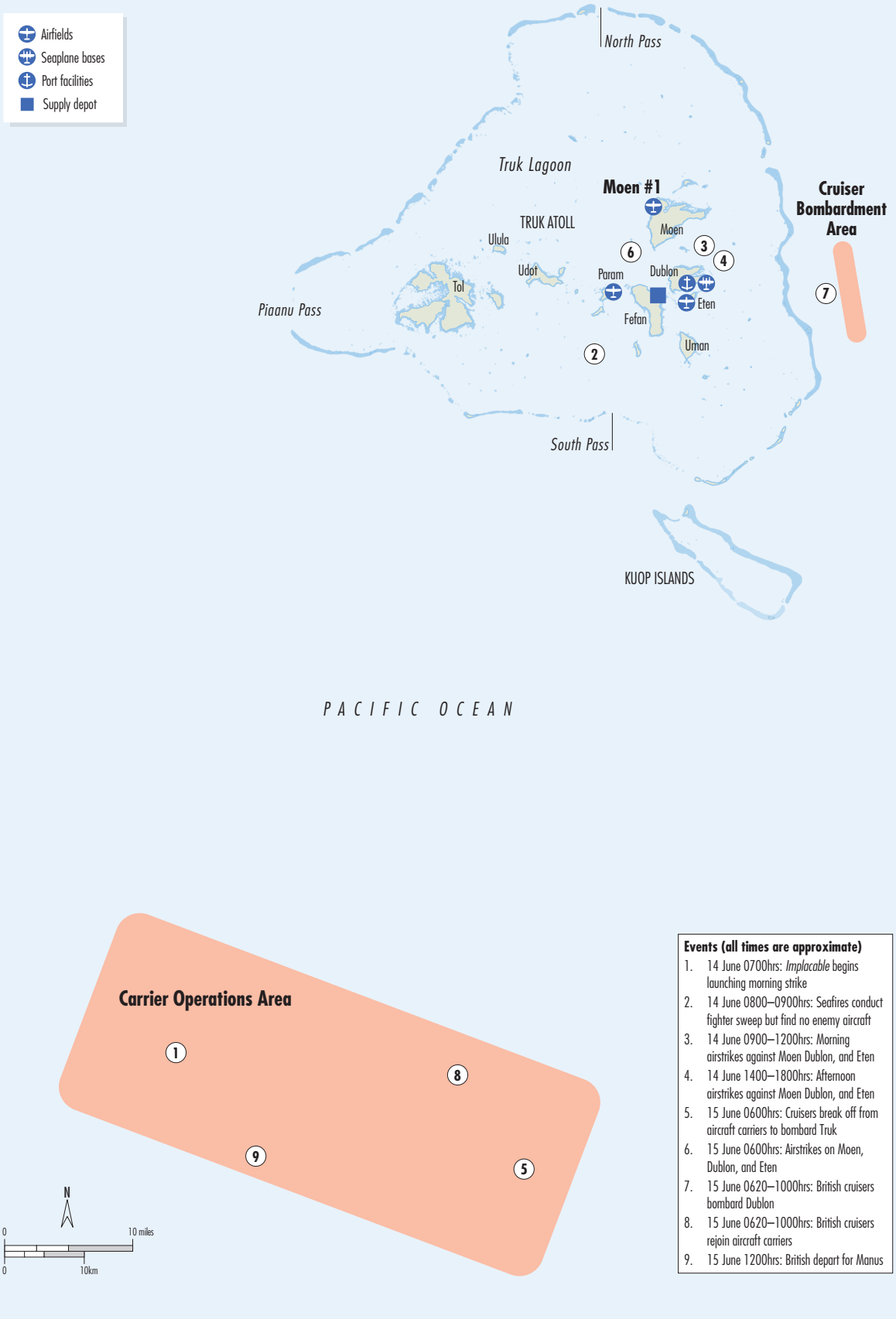
Fleet. Its air group in the Pacific consisted of 48 Seafires, 15 Avengers, and 12 Fireflies, a total of 75 aircraft. HMS *Indefatigable* had carried 69 aircraft, and the *Illustrious* 52. HMS *Victorious* and *Indomitable* the two fleet carriers remaining in the East China Sea, carried only 105 combat aircraft between them.

HMS *Implacable* was one of two Implacable-class fleet carriers built for the Royal Navy in World War II. Started in 1939 as an improved version of the Illustrious-class, it entered service late in 1944. It had a 32,600-ton full load displacement, a top speed of 32.5 knots, and a range of 12,000nmi at 10 knots. More heavily armored than US carriers, its protection included 3in flight deck armor. It had a waterline length of 730 feet, an overall length of 766½ feet, and could carry up to 81 aircraft.

The Admiralty was reluctant to send the *Implacable*, new to the Pacific, straight into the kamikaze-filled skies around the Ryukyu Islands without a combat testing first. The capital units of the British Pacific Fleet would be in Sydney for the first half of June, setting out for Manus after that. This gave HMS *Implacable* three to four weeks after arriving at Manus before it would join those ships. Rather than have it sit anchored at Manus, orders were given to have it attack Truk in a training operation to work up its new air group in Pacific waters. As with the practice raids conducted by the US Army Air Force, it offered an opportunity for the *Implacable*'s air group to first experience combat in a low-threat environment.

A task group was pulled together around the *Implacable* from British Pacific Fleet ships at Manus. It contained four light cruisers: HMS *Swiftsure* and *Newfoundland*, HMCS *Uganda*, and HMNZS *Achilles*. The *Swiftsure* was a Minotaur-class cruiser, the most modern in the Royal Navy in 1945. HMS *Newfoundland* and the *Uganda* were both Colony-class vessels, laid down in 1939, while the *Achilles* was an old veteran, a Leander-class cruiser, built in the early 1930s and lent to the Royal New Zealand Navy in 1936. The *Uganda* was also a Dominion vessel, transferred to the Royal Canadian Navy in October 1944. Five T-class destroyers completed the escort: the *Troubridge*, *Tenacious*, *Termagant*, *Terpsichore*, and *Teazer*.

Also included was an escort carrier, HMS *Ruler*, which carried no aircraft but accompanied the force to serve as a spare flight deck, giving aircraft a place to land if the *Implacable* became unavailable. Against that advantage, the *Ruler* had a top speed of just 18 knots and a cruising speed of around 12 knots. It thus slowed the force down.



Events (all times are approximate)

1. 14 June 0700hrs: *Implacable* begins launching morning strike
2. 14 June 0800–0900hrs: Seafires conduct fighter sweep but find no enemy aircraft
3. 14 June 0900–1200hrs: Morning airstrikes against Moen Dublon, and Eten
4. 14 June 1400–1800hrs: Afternoon airstrikes against Moen Dublon, and Eten
5. 15 June 0600hrs: Cruisers break off from aircraft carriers to bombard Truk
6. 15 June 0600hrs: Airstrikes on Moen, Dublon, and Eten
7. 15 June 0620–1000hrs: British cruisers bombard Dublon
8. 15 June 0620–1000hrs: British cruisers rejoin aircraft carriers
9. 15 June 1200hrs: British depart for Manus

OPPOSITE OPERATION *INMATE*

The raid was the first – and only – independent combat cruise by the Royal Navy in the Central Pacific during World War II. The raid as planned was more similar to the US carrier raids against the Gilberts and Marshalls in February 1942 than the air strikes previously made against Truk by Task Force 58. The February 1942 raids involved task groups built around a single fleet carrier, four to five cruisers, and a similar number of destroyers. Similarly, like Operation *Inmate* (as the Royal Navy codenamed the *Implacable*'s strike), these early raids were more exercises than efforts to reduce Japanese power. They were opportunities to practice carrier doctrine while reminding the Japanese that the Allies remained a force with which to reckon. In 1942, the ally in question was the United States, striking back after a humiliating set of defeats. In 1945, it would be Great Britain and its Dominions, reminding Japan that the British Lion still had teeth.

The task force left Manus on June 12. Two days later, it was off Truk Atoll. Along the way, new orders had been sent directing the cruisers to conduct a gunnery bombardment of Truk. Attacks began on the morning of June 14, opening with a fighter sweep.

Twenty-four Seafires were sent in the first wave, half of those aboard the *Implacable*. It was launched in the late morning, with the Seafires circling the atoll at a high altitude, challenging the Japanese to take off and fight them. Whether because the British achieved surprise or because the Japanese preferred to husband their resources for more even odds, there was no response. There were by now at most seven flyable Japanese aircraft at Truk. They stayed on

Operation *Inmate*

The two-day airstrike on Truk by a British Pacific Fleet task group built around the aircraft carrier *Implacable* was as much a live-fire exercise as a combat operation. It was an opportunity to practice carrier combat in a low-risk environment. By June 1945, Truk lacked aircraft with which to resist a carrier strike. Even anti-aircraft ammunition was low.

Furthermore, there was little left to hit. Dublon's and Fefen's facilities had been bombed flat or moved underground, while Param, Eten, and Moen No 2 airfields had been abandoned. Dublon's seaplane base was still barely in operation, largely because you cannot sink a seaplane basin or crater a runway made of water. Only Moen No 1 airfield still had aircraft operating out of it. As a result, it was a focus of British air attacks on June 15.

One prominent target still remaining was the radio station building at Moen No 1. Like many Japanese radio facilities, it was made of concrete, making it one of the sturdiest buildings in Truk. Thus, it had survived through 15 months of aerial attack. In addition to bombs, it was struck by rockets. Developed by Britain, the latter were solid-fuel anti-tank rockets originally modified for use against U-boats. Introduced in 1943, they traveled at near-supersonic speed. They had solid steel warheads and used kinetic energy to crack a target open. Each rocket weighed 66lb and they could be carried by most carrier aircraft.

This plate shows one of these attacks, made by two of the 11 Fairey Fireflies carried aboard HMS *Implacable* during Operation *Inmate*, making a rocket attack against the radio building at Moen No 1 airfield. The Firefly was a multiple-seat, multi-role aircraft. It could be used for reconnaissance, ground attack, or as a fighter. It was the successor to the earlier Fairey Fulmar, the Royal Navy's main fighter at the start of World War II.

Although the Firefly was an outstanding strike aircraft and the main reconnaissance aircraft used by the Fleet Air Arm in 1945, it was lacking as an air superiority fighter. In that role, the Royal Navy used the Seafire, the maritime variant of the Supermarine Spitfire. By 1945, the Seafire was more than just a Spitfire with a tail hook and folding wings. It had a Griffin engine instead of the Spitfire's Merlin, heavier landing gear, and other changes intended to protect the aircraft from saltwater corrosion.

Seafires were used during Operation *Inmate* to protect other Royal Navy aircraft from attack by Japanese aircraft. In this plate, two Seafires can be seen flying top cover during this mission. However, after it became apparent there would be no Japanese aircraft resisting the British attack, the Seafires were used to strafe installations at their targets. In this case, two Seafires can be seen beyond the Fireflies in the foreground strafing the runway at Moen No 1 airfield.

The British Pacific Fleet applied the lessons learned by the Truk strike to their more general air operations over the final two months of the war.

The Fleet Air Arm used the Grumman Avenger as their torpedo bomber in the British Pacific Fleet. In Operation *Inmate*, due to a lack of enemy ships, it was employed as a level bomber rather than carrying torpedoes. (AC)

the ground, camouflaged, during the two days of Operation *Inmate*. The garrison chose to safeguard them, rather than expend them against impossible odds.

Finding no fighter opposition, the British aircraft began making strikes against targets on Dublon, Moen, and Eten. The first attack wave consisted of 15 Avengers and Fireflies escorted by nine Seafires. It approached the atoll at 9,000ft, broke formation after crossing the reef, and then circled the main islands, dropping to 3,000ft to seek out targets. Finding something deemed worthy of attack, the aircraft dived at a 30-degree angle and released bombs or fired rockets at 1,500ft. Returning to altitude, the aircraft resumed circling until they saw a new target, and attacked again, until all ordnance was expended. Once the bombers had finished, the Seafires, which had been flying top cover, attacked. They dove to tree-top heights to strafe buildings and airfields.

This round of attacks ended before noon, when the aircraft returned to the *Implacable* and were refueled and rearmed as their crews ate lunch. Then, in the early afternoon, a second wave was sent to hit Truk. It too consisted of a mix of 15 Avengers and Fireflies, with nine Seafires providing top cover. As before, the bombers struck first; the Seafires strafed after the bombers were finished.

More airstrikes followed on the next day. They followed the pattern set on the first day, with Avengers and Fireflies attacking first with bombs and rockets, and the Seafires following up on strafing runs. Again, Truk's surviving aircraft remained on the ground, with antiaircraft fire providing the only resistance. Attacks were made in both the morning and afternoon.

The aircraft made numerous strikes on Truk's docks, airfields, gun positions, radio stations, and shipping. The British also attacked what was left of the floating dry dock. The airstrikes achieved little, however. This was less due to any inaccuracy or inability of the Fleet Air Arm aircrews than it was to the lack of any worthwhile targets. In reality, by the time the British task force reached Truk, everything that had made Truk a threat was gone. The remaining shipping consisted of small vessels only useful within the atoll. The floating dry dock was unusable and empty, having been attacked numerous times over the past 15 months. Truk's airfields were largely unusable. All but Moen No 1 were abandoned, while Moen No 2 was deserted after the February 1944 airstrikes.

The next day, task force cruisers bombarded Truk. Dublon Island was the main target, including the seaplane base at Dublon and the tank farm. The cruisers separated from the aircraft carriers, leaving half the destroyers to provide antisubmarine coverage for the aircraft carriers. The four cruisers and the rest of the destroyers steamed a few miles east of the atoll,

The lead-ship of its two-ship class, HMS *Implacable* was the largest aircraft carrier commissioned by the Royal Navy in World War II. It was comparable in size and performance to the US Essex-class, but carried fewer aircraft. (Wikipedia)

bombarding Dublon from an average range of 21,000 yards. Each cruiser fired between 20 and 25 broadsides during the bombardment. Spotter aircraft were flown to correct fall of fire. Seafires provided fighter cover for the cruisers during the bombardment, while Avengers were aloft as well, probably conducting antisubmarine sweeps.

As the bombardment ended and the cruisers were withdrawing, two aircraft appeared from the direction of Truk. Some of the cruisers, including HMNZS *Achilles*, opened fire with antiaircraft guns. Fortunately, before any hits were scored, the aircraft were identified as Avengers. They may have been attacking Truk or possibly doing an antisubmarine sweep. Fire was checked after the *Achilles* fired six salvos. It was an anticlimactic end to an anticlimactic action.

By June 1945, everything of value at Truk was hidden and buried. Barracks, supply and ammunition dumps, repair shops, even aircraft hangars had been relocated to underground bunkers, protected by several feet of dirt and elaborately hidden. What aircraft could not be stored underground were in camouflaged revetments. Truk's tropical climate and fast-growing foliage made hiding things easy.

The British aircraft did not experience much resistance. The shore batteries remained silent, both for concealment and to preserve ammunition to resist an invasion. There was some antiaircraft fire, but ammunition was being rationed. None had arrived in nearly a year. Antiaircraft fire downed only one British aircraft during the raids, a Seafire. Four Avengers were also lost, but these were to accidents, most occurring during launch and landing operations. The US provided Catalina PBY flying boats to recover downed British airmen. Their use was further evidence of Truk's feebleness. The Catalina, a slow, parasol-winged amphibian, would have been easy prey for enemy fighters. The Catalinas proved unnecessary; Royal Navy destroyers rescued all the downed fliers.

Despite its lack of tangible strategic results, Operation *Inmate* provided the *Implacable*'s air group with valuable combat experience at a low cost. The operational losses experienced were similar to normal wastage associated with high-intensity flight operations, and would likely have been the same had the *Implacable* simply been practicing deck-strike missions. *Inmate* tested the concept of using a second carrier as an extra flight deck, which proved useful. It also identified potential weaknesses in operational practice, as exemplified by the friendly-fire incident when the cruisers began firing at their own aircraft after the bombardment.

The most concrete damage done to the Japanese by this raid was self-inflicted. The cruiser bombardment convinced Truk's garrison the long-feared invasion was imminent, that it was the prelude to an amphibious landing. Headquarters began burning its records to deny intelligence to the enemy. When it became clear no landing was occurring, they stopped.

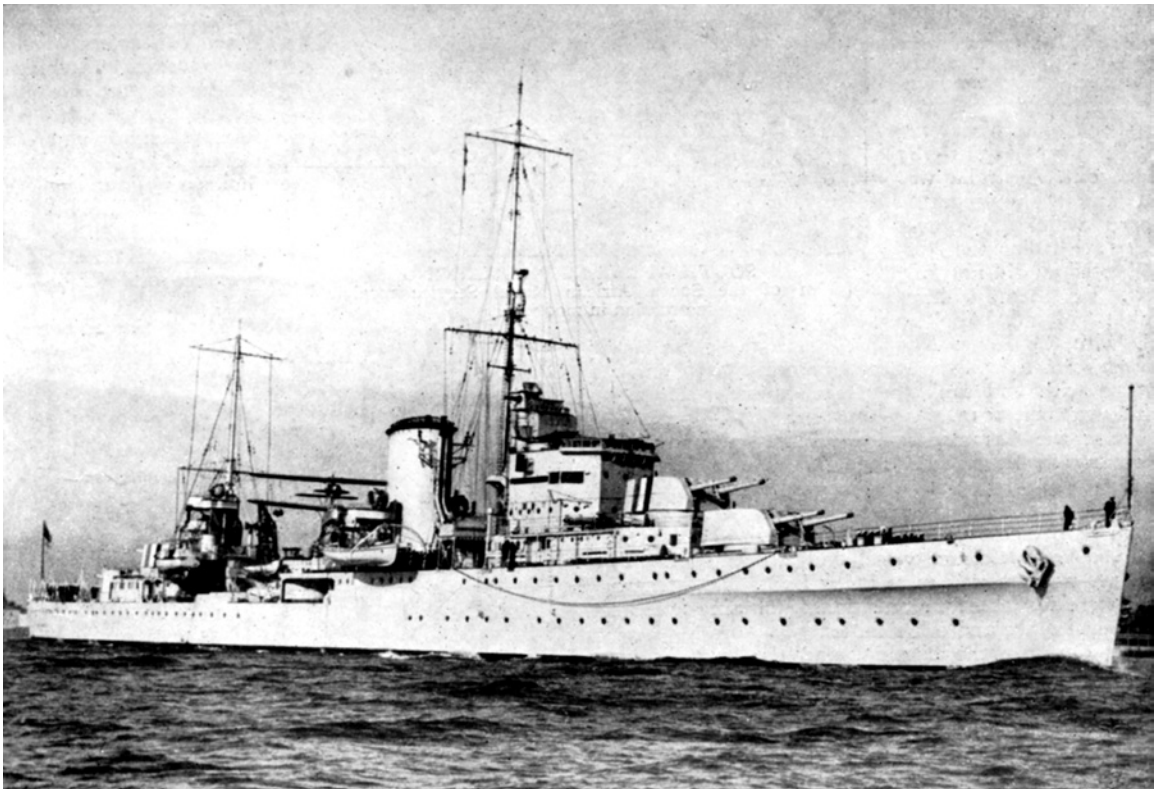
The British task force was back at Manus on June 17, remaining there for the rest of the month. The British Pacific Fleet's main body did not leave Sydney until June 28.

It collected the ships in Manus on its way back to the Ryukyus, and was back on station in July, supporting the end of Okinawa operations and preparing for the naval phase of the invasion of Japan. The presence of HMS *Indomitable* increased the British Pacific Fleet's air presence by nearly two-thirds.

Meanwhile, after Operation *Inmate*, Truk's garrison went back to its normal concerns: growing food for its inhabitants, native and Japanese, and enduring air raids. The garrison had grown even as the stockpiles of food were being destroyed by air raids. The submarine blockade kept further shipments of food from reaching Truk. Continuing air raids and inadequate port infrastructure made unloading the few arriving ships challenging. Arrivals ceased almost entirely after the fall of the Marianas in June 1944.

Consequently, rationing of food, provisions, and ammunition began in early 1944, soon after the February carrier strike. As food shortages grew, everyone at Truk Atoll became part-time farmers. The garrison and civilians split into groups, were assigned plots of land, and assigned the task of planting, cultivating, and harvesting their own food. By the time of Operation *Inmate*, virtually all of Truk's unoccupied land was under cultivation.

Even the Allies gave up on Truk after Operation *Inmate*. US air raids tailed off, as if the Army Air Force finally realized there was little left worth bombing on Truk. Reconnaissance flights continued, but it was unlikely in the summer of 1945 that the Japanese Combined Fleet would ever sail again from Truk Lagoon. Most of its ships were scattered on the bottom of the Pacific Ocean by June 1945. Lesser threats were viewed as possible. One such was that Truk's garrison might piece together enough aircraft to launch a kamikaze strike against US Superfortress bases at Guam. Yet photo-reconnaissance showed no evidence of any activity indicating that might happen. Except for an occasional practice mission by 509th Superfortresses rehearsing atomic bomb drops, Truk's farmers were left to raise their crops in peace as the war wound to a close.



HMNZS *Achilles* had been in World War II since its outset, gaining fame during the 1939 Battle of the River Plate. Participation in Operation *Inmate* was one of its last World War II combat activities. This picture shows its appearance in 1940. (AC)

AFTERMATH AND ANALYSIS

The training cruiser *Katori* was one of the ships caught at Truk by the February carrier raid. It was able to raise steam and exit the atoll, despite attacks by aircraft from five different US carriers. Damaged, the *Katori* ran into a US battleship group guarding the exits and was sunk by gunfire. (AC)

The invasion of Japan never occurred. Neither did an invasion of Truk. The war ended on August 15, 1945. Japan surrendered, citing the two atomic bombs as the reason. In reality, the bombs offered Japan a face-saving means of ending a war that had been lost since the loss of the Marianas a year earlier.

Truk had long ceased to be a real threat. Its garrison had concentrated more on growing their own food than on waging war on the Allies. They kept a few aircraft flying, but this was more saving face than belligerency. Had they stopped all combat flying, it would be an admission they were beaten. Up until the surrender, they kept up the pretense that they were not a self-administered prisoner-of-war camp for the Allies.

While Japan surrendered on August 15, Truk's capitulation, along with that of many bypassed Japanese garrisons, took longer. Truk's turn arrived on September 2, when the heavy cruiser *Portland* arrived. Aboard was Vice-Admiral George D. Murray, USN, who commanded US forces in the Marianas. His flagship, the *Portland*, had been in the Pacific War from the start, escorting the first *Lexington* two days' steaming from Pearl Harbor on December 7, 1941. It fought at Coral Sea, Midway, Guadalcanal, and Leyte Gulf, and had participated in the second carrier strike against Truk in April 1944. Murray, too, had been in the war from the beginning, commanding USS *Enterprise* from March 1941 until June 1943.

The surrender ceremony took place aboard the *Portland*. Signing for the Japanese was Hara Chūichi, also a long-term Pacific War veteran. He commanded Japan's 5th Carrier Division, made up of the aircraft carriers *Shokaku* and *Zuikaku,* at Pearl Harbor and through the Battle of the Coral Sea. His career had gone into eclipse after losing the carrier *Ryujo* at the Battle of the Eastern Solomons. He was "rewarded" with command of the Fourth Fleet in February 1944, after Operation *Hailstone*. Its previous commander was scapegoated for the loss of ships and sent home. By then, the Fourth Fleet was a paper fleet, and Hara effectively only commanded the Truk garrison.

The articles of surrender were quickly signed. Over the next six months, Truk's garrison was repatriated to Japan. Truk and the Caroline Islands changed from a League of Nations

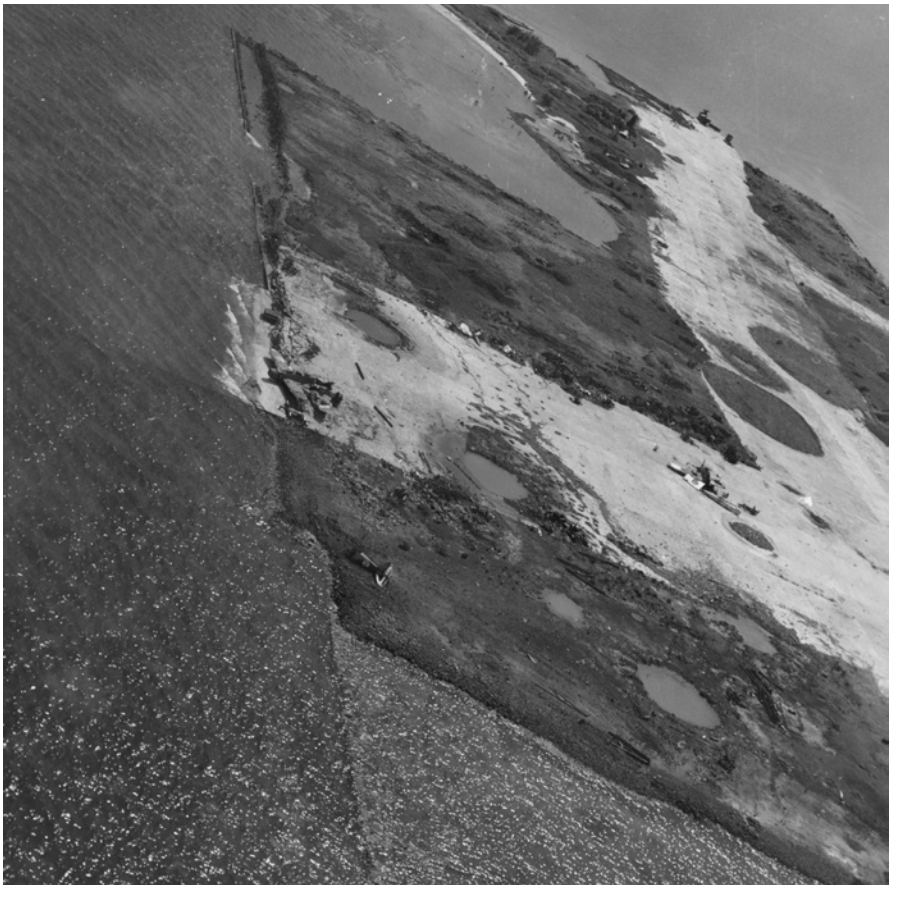
Truk surrendered on September 2, 1945, two weeks after the Home Islands. The instrument of surrender was signed aboard the heavy cruiser USS *Portland*. *Vice* Admiral Hara is shown signing the articles as Vice-Admiral George D. Murray watches. (USNHHC)

trust territory to a United Nations trust territory. In 1947, the United States, which had been occupying Truk since 1945, was awarded the administration of the United Nations Trust Territory of the Pacific Islands, which included Chuuk Atoll (as Truk was renamed by its native inhabitants). The Trust Territory of the Pacific Islands also included the Marianas, Marshalls, and Palau. In 1979, Chuuk, along with Pohnpei, Yap, and Kosrae, formed the Federated States of Micronesia, separating from the rest of the Trust Territory of the Pacific. It gained full independence in 1994, although it remains associated with the United States.

Today, Chuuk is a tourist spot. Moen No 1 Airfield is Chuuk International Airport, and the island it is on is called Weno rather than Moen. Most of the rest of the islands use the same Chuukese name the US called them by in World War II, although Eten is now Etten Island and Ulalu – where the RDF station was located – is called Romanum Island. Chuuk's tropical climate lures visitors from around the world, including many from the US, Australia, and even Japan. The sheltered waters of Chuuk Lagoon lures sport divers. An attraction unique to Chuuk is the numerous wrecks of ships and aircraft that litter the lagoon's bottom. Wrecks can be dived for elsewhere, but not with the density or variety found at the lagoon's sea bottom, which is shallow enough to provide sport divers easy access using standard scuba gear.

During the 18-month Truk campaign, Truk was transformed from "the Gibraltar of the Pacific" to an ineffective garrison. The Imperial Japanese Navy lost at least 420 aircraft. Naval losses included three light cruisers, two auxiliary cruisers, four destroyers, one seaplane tender, one submarine tender, several patrol craft, over 33 merchant vessels, and numerous harbor tenders, barges, small craft, and fishing boats. Most were destroyed in the first carrier airstrike against Truk. Others were sunk by the Army Air Force in March and April 1944. Any surviving vessels were eliminated by the second carrier strike.

Subsequent Army Air Force raids and the Royal Navy attack in 1945 sank almost no shipping, simply because no shipping remained to be sunk. By the time of Operation *Inmate*, Commonwealth forces were reduced to attacking previously sunk vessels or Truk's floating dry dock, which had sunk in water shallow enough for its upper works to remain above water.



A photograph of the landing ramp at Dublon's seaplane base at the time of surrender. Wrecked aircraft and flattened buildings are the only things there. (USNHHC)

Its airfields were similarly destroyed. All of the airfields were only intermittently available after the first carrier strike. The airfields were abandoned one-by-one as a result of the Allied onslaught. Moen No 2 shut down after the first carrier raid. Eten was entirely abandoned after the second carrier raid. Param lasted longer, hanging on until July 1944. Dublon's seaplane base effectively closed in June or July 1944, although flying boats and seaplanes occasionally still landed there until April 1945. Only Moen No 1 remained operational, and even that did not remain uninterruptedly in commission.

The Allies destroyed the runways through "post-holing" surfaces with 100lb and 250lb bombs. As the runways were built at low elevations, holes created on them filled with water, making the runways unusable until the holes were filled, especially at high tide. Larger bombs were used to "post-hole" Param, as deeper craters were needed on that island to reach the water table.

By February 1945, a year after the Allied campaign on Truk began, all above-ground island installations were 90–95 percent destroyed. This included the buildings that existed prior to February 1944, and any subsequently erected or repaired after Allied air raids began. The original buildings were well-constructed, even if they were poorly protected. If replaced, they were supplanted by flimsy wooden structures, mainly assembled from native materials. Many buildings were just never replaced, especially after the second carrier raid. There were no materials available with which to do so. The only functional installations on Truk by September 1945 were those relocated to camouflaged, underground shelters.

Truk lost its usefulness as a naval port with the first carrier raid. That raid also minimized its usefulness as an air base and supply center. The first carrier raid ended Truk's value as an aircraft ferry center, an air depot, and an offensive air base. The second carrier raid finished

The Truk garrison was prepared for a landing that never came. Prepared positions, similar to the one shown in this drawing taken from a US intelligence magazine, awaited to repel invading troops throughout Truk's atoll and inner islands. (AC)

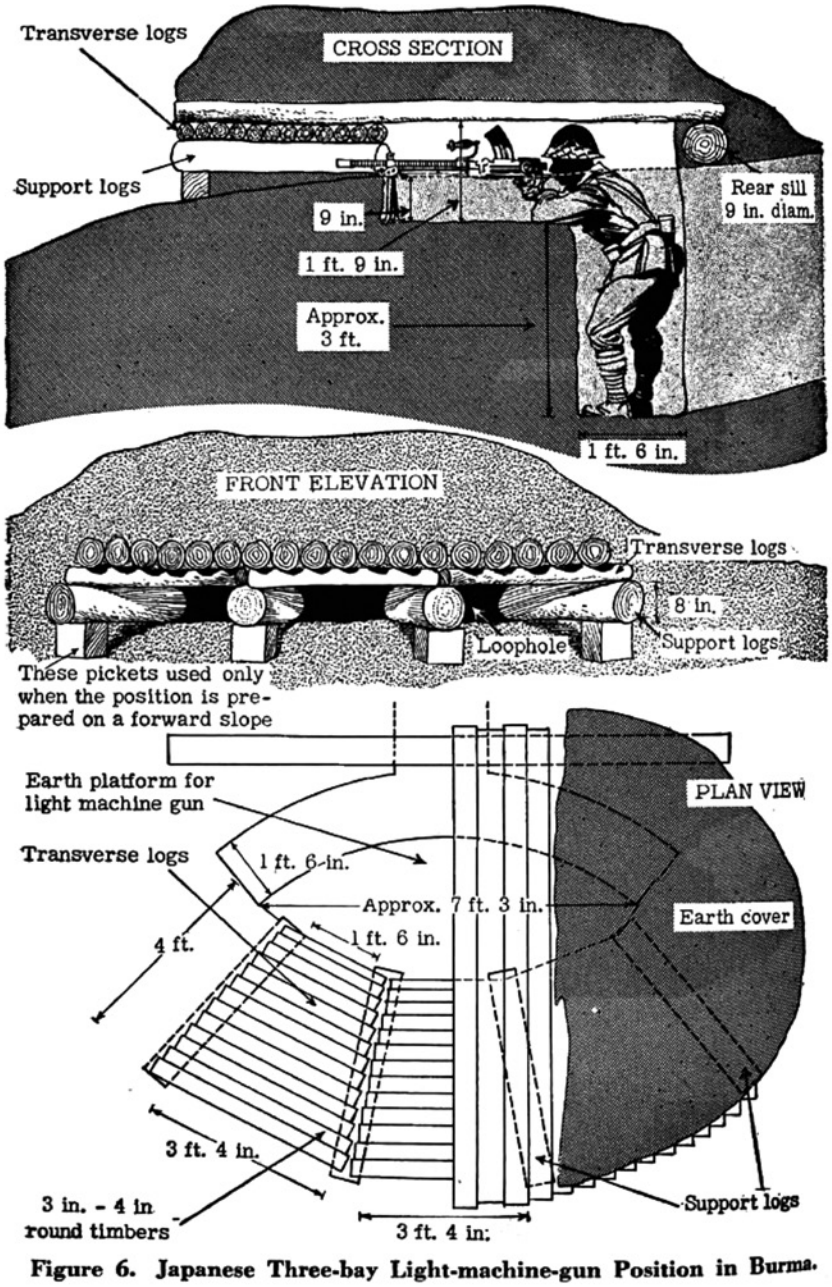


Figure 6. Japanese Three-bay Light-machine-gun Position in Burma.

Truk as a logistics center and a defensive fighter base. High-altitude bombing raids by B-24s and B-29s kept Truk neutralized, preventing restoration of its capabilities. At the end of June 1944, Truk's value as an airbase completely disappeared. From July 1944 to the end of the war, no more than 35 aircraft were based there. No more than eight of those were operational and capable of flying at any one time.

Japan abandoned Truk as a naval base immediately prior to the second carrier raid, and its navy was in the process of withdrawing the remaining ships when the attack occurred. Had the attack occurred when the Japanese expected it, a week later, the lagoon would have been largely empty. As it was, the major warships had already left. The absence of these warships

reduced Truk's antiaircraft defenses. Had they been present, however, Truk could well have become the "Japanese Pearl Harbor," not in the sense of being a heavily fortified port, but in being a place where trapped battleships were sunk by carrier aircraft.

Its usefulness as a supply base shrank as quickly as its usefulness as a naval port. The February carrier raid, although it had focused primarily on shipping in the lagoon, managed to significantly reduce stockpiles and reserves in the Fourth Fleet supply base. Provisions and food stocks were reduced by 75 percent. The Fourth Fleet supply base also lost 70 percent of its fuel stores, 65 percent of aviation stores, 60 percent of stockpiled clothing, and 35 percent of stored ammunition.

Some of this was due to supplies being in ships in the harbor, but much of it was down to these items being stored in open dumps or unprotected warehouses. One hit in an open ammunition dump resulted in the destruction of the entire amount stored there. Wood-frame provisions and supply warehouses caught fire easily and the flames quickly spread. After the February raids, the Japanese began constructing underground storage facilities, with the priority placed on ammunition storage. This work was incomplete when the second carrier raid occurred in late April. A B-24 night raid in early April managed to destroy an ammunition dump and set a major warehouse on fire, and the April carrier raids destroyed another. However, underground storage had its own problems. Caves created to store ammunition were damp, and 40 percent of the ammunition moved to them was lost due to deterioration.

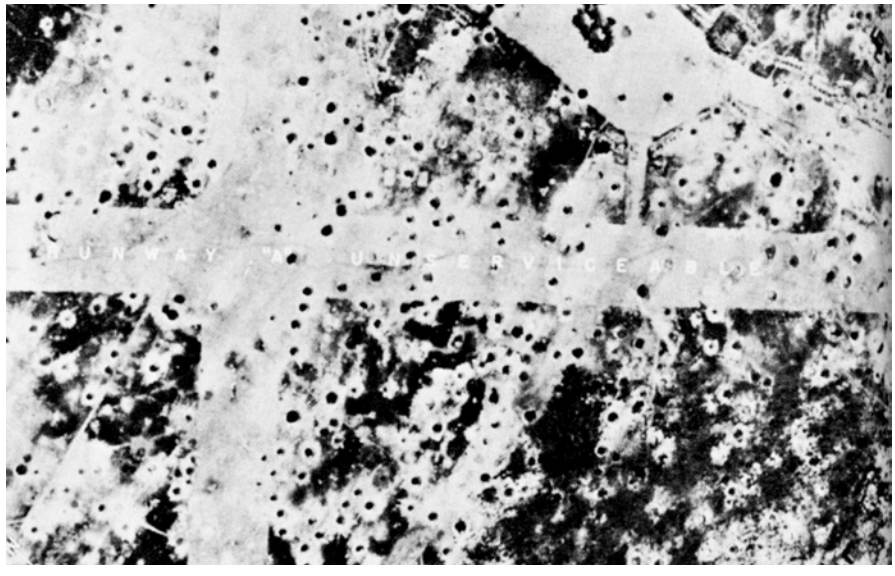
Japanese losses were due to cumulative damage. As spectacular as the damage caused by a single carrier raid was, that damage could have been repaired if not followed up by subsequent raids. A few examples illustrate this.

Moen No 2 had originally been built as a seaplane base. A 3,300ft runway had been added, made of crushed rock and concrete, and was nearing completion. The first carrier raid destroyed one of its two hangars, its control tower, and all 14 aircraft at the field. The other hangar suffered 80 percent damage. Despite this, the Japanese began to repair the airfield, continuing work on the runway so it could be used as a fighter strip and emergency field. No aircraft were stationed at Moen No 2 after February 18, 1944. It was only used as an emergency strip after that. The second carrier raid flattened most of the buildings still standing; the power plant, barracks, and warehouses. While the Japanese rebuilt the barracks and control tower, these were demolished in a February 18, 1945 air raid.

The Fourth Fleet Headquarters and fleet facilities at Dublon provide a better illustration of the cumulative effects of multiple attacks. Having been largely ignored during the February carrier raid, the communications center was hit in the first B-24 bombing mission on March 15, 1944. It suffered 10 percent damage in that raid. Subsequent raids in June and August destroyed more of its buildings, and by the end of August, all of its facilities had been destroyed. In late March 1944, a B-24 raid destroyed 80 percent of the barracks of the Fourth Fleet's construction department. A subsequent May raid destroyed the unit's warehouses, including one with 1,000 tons of rice. The Fourth Fleet Headquarters buildings suffered 50 percent damage during the second carrier raids, but repaired that damage in five days. They were flattened by subsequent B-24 raids.

A similar process was seen at the naval base, which had a headquarters building, eight barracks, five machine shops, and a sick bay. The April carrier raids caused 20 percent damage to its facilities. A mid-July 1944 B-24 raid demolished another 60 percent of the facility. Then on October 30, another B-24 raid destroyed or damaged 60 percent of the remaining buildings. The facilities personnel were driven to the hills, where they built shacks from salvaged material. A B-29 raid flattened most of these during a final raid on August 7, 1945. This story was repeated on Eten, Param, Fefan, Ulalu, and Uman. Military installations on all of these islands were repeatedly attacked and systematically reduced.

Could Japan have done a better job of defending Truk? Was it possible for Japan to have prevented the United States from neutralizing Truk? The answer to both questions is "probably not." The reasons lie in the structural limitations of the Japanese military.



After June 1944, the US concentrated on keeping Truk's airfields unusable. Many raids were flown to "post-hole" runways, filling them with bomb craters to make them unusable. This shows a post-holed runway at Wotje, another bypassed atoll in the Carolines. (USAF)

A robust defense of Truk required aircraft and pilots, and Japan was short of both, especially pilots. Its pilot training program was inadequate. Two years into the war, it was still focused on producing a small number of excellent pilots. Washout rates remained high. Similarly, aircraft production was too low, aimed at building low hundreds of aircraft rather than the thousands the United States was turning out. Yet Japan was still producing more aircraft than pilots qualified to fly them in combat.

At the time of the February 1944 carrier raid, nearly 100 aircraft were at Truk awaiting pilots to ferry them. Nearly as many aircraft were nonoperational due to a lack of aircraft mechanics and fitters to work on them. In both cases, those aircraft were parked in the open. The aircraft awaiting ferrying were nose-to-tail on the apron at Eten. Many were fighters. Had pilots been available for the operational aircraft awaiting transfer, the initial US fighter sweep could have been met by 100–120 Zeros instead of the 45 which it did face. In that case, the fight could have gone differently, with subsequent bomber raids being met by significant fighter resistance.

Getting 100 fighters into the air was predicated on preparedness and sufficient advanced warning. Normally, only 24 aircraft were on standby status at dawn on Truk: four in the air and 20 on the ground. Additional aircraft had to be fueled, armed, and manned before they could take off, a process that consumed time. In the February raid, Eten Airfield had only ten minutes' warning. Assuming the ready aircraft were split between Eten and Moen No 1, Eten could have launched ten aircraft before the arrival of US Navy fighters. It would not have time to launch many more, much less fuel, arm, and man additional aircraft. The Moen airfields received no warning. Their aircraft were surprised on the ground. Only Param got adequate warning. Most of the aircraft launched by the Japanese probably came from there, but it was a bomber base.

Truk had radar, but lacked an adequate system to broadcast warnings. Although Japanese radar picked up US Navy fighters 30 minutes before they reached Truk Atoll, word passed slowly and incompletely. Param got the warning soon enough to act on it. Eten got the word 20 minutes later, and Moen never got it. Nor did things improve over the next month. The first night raid on Dublon, on March 15, caught the Japanese by surprise. Dublon did not black out until the bombs began dropping.

Truk's air warning system improved after that, but Truk – indeed Japan – never developed integrated air defense systems. Air interception worked during daylight B-24

missions, when the fighters could easily spot the attacking aircraft. Night fighters fought virtually blind, however. Truk's ground radars did not direct them to bombers. Truk night fighters lacked onboard radar, which made interception dependent on visual contact. This inefficiency became irrelevant after the second carrier raid, which eliminated most of Truk's air garrison. Thereafter, Truk's fighters went from being a menace to B-24s and B-29s to a mere nuisance.

An OS2U Kingfisher being recovered after rescuing a downed pilot within Truk Lagoon. The rescued pilot is in the back seat, while the Kingfisher's radioman stands on the wing to attach the aircraft so it can be hoisted aboard USS *Baltimore*. (USNHHC)

Could the Allies have done a better job of reducing Truk? The answer again is "probably not." The United States Navy started with little intelligence about Truk. The first reconnaissance flight over the island took place only two weeks before the first carrier raid. Planning for that raid was based on the photographs taken on that flight and pre-war intelligence estimates. The latter were based on reports that exaggerated the strength of Truk's defenses.

Sending in only three of the four available task groups in the initial attack was probably viewed as a necessary gamble. Aircraft were needed to cover the Eniwetok invasion, but Truk also had to be neutralized prior to the Eniwetok invasion. Dividing forces in the face of the enemy is generally an invitation to defeat in detail, but as at Princeton in 1777 and Chancellorsville in 1863, it led to success on this occasion.

The United States overestimated Japanese strength at Truk, especially before the first attack on Truk. In warfare, that is generally better than underestimating your enemy. The US Navy sent the biggest force they could for that attack. They also imitated the Japanese attack on Pearl Harbor by choosing a route which maximized the opportunity to reach the launch point undetected, taking a roundabout route and refueling before the final run-in.

Finally, they used innovative tactics to increase their chance of success. The mass fighter sweep followed by hitting the Japanese airfields with fragmentation bombs was calculated to gain air superiority. The tactic had been developed for the Truk raid, an example of the attention to detail paid by US planners. The combination exceeded US expectations for success. It would be repeated throughout the rest of the war. The use of submarines as lifeguards to rescue downed pilots was another example of attention to detail, helping to preserve a scarce resource (aircrew). This innovation, too, would be copied throughout the rest of the war.

The second carrier strike was the result of realizing and seizing an offered opportunity. Low aircraft casualties in an operation prior to this raid and the location of the fast carrier task force as the operation ended allowed an attack on Truk while returning to their advanced anchorage. Operations orders and attack plans were pulled together while the task force refueled off the Allied-held Admiralties. It proved a masterpiece of improvisation, knocking Truk's air garrison out of the war and removing what threatened to transform the high-altitude bombing campaign against Truk from potentially bloody into something considerably less expensive.

It could be argued that the missions flown against Truk after August 1944 were unnecessary and that those resources might have been better used elsewhere. Determining the exact force level appropriate is an exercise better done by postwar armchair generals and hobbyist wargamers than by those actually in the arena when combat occurs. As the Japanese demonstrated, underestimating your enemy's capabilities leads to defeat. Additionally, many

A Grumman Avenger at the Lone Star Flight Museum in Houston, Texas. This is representative of the various US and British aircraft types that fought at the reduction of Truk preserved at museums around the world. (William Lardas photograph)

of the late-war missions against Truk were flown by new units, giving crews combat experience in a controlled environment. Operation *Inmate* was probably the best example of that type of exercise.

Surviving aircraft

Many examples of aircraft used during the Truk campaign still exist, although the number of existing aircraft actually used to bomb or defend Truk is much smaller, and less-well defined. The two best-known aircraft known to have bombed Truk are the B-29s "Enola Gay" and "Bock's Car". Both flew practice missions against Truk before flying their better-known atomic bomb missions. Similarly, most other existing B-29s that flew combat missions against Japan probably also flew in raids against Truk.

The main contributors to Truk's demise were the two US carrier raids mounted in February and April 1944. Aircraft used for these attacks included the F6F-3, the SBD Dauntless, the SB2C Helldiver, the TBF and TBM Avenger, and the F4U-5N (the night fighter version of the Corsair). At the time of writing, there are a total of 22 F6Fs in existence, of which seven are F6F-3s in production until April 1944, when replaced by later models. Six of the seven are in flying condition. There are 23 SBDs of various makes in existence, all but one in the United States. Six are airworthy. Only nine SB2C Helldivers still exist, seven in the US, with only one flyable. There are nearly 70 Avengers still in existence, in eight different countries (including Switzerland). Seven F4U-5Ns exist; four are flyable.

The B-24 also made major contributions to Truk's demise. Thirteen still exist, of which two are airworthy, but none appear to have been used at Truk.

Of the British aircraft used against Truk, six Seafires still exist and approximately 24 Fireflies. Two of the surviving Avengers mentioned earlier were used by the Fleet Air Arm and four by the Royal New Zealand Air Force, one of which is airworthy. Two surviving Seafires and three Fireflies are still airworthy. It is possible that one of the existing Fireflies may have attacked Truk. The rest of the Fleet Air Arm survivors almost certainly did not.

Japanese survivors are thinner in number. There are 30-odd surviving Mitsubishi Zeros. Many appear to be of uncertain provenance, a few being assembled from bits and pieces of multiple wrecks or with a large number of replica parts. No Nakajima B5Ns survived the war intact, although parts of two wrecks are on display, and several flying replicas have been constructed. One B6N still exists. At present it is disassembled at the National Air and Space Museum in Washington DC. None of these appear to have been used at the defense of Truk.

Similarly, one Nakajima J1N1 still exists, as do two Yokosuka D4Ys, three or four wrecks of Mitsubishi G4Ms, and one E13A and one Kawanishi H8K (the Emily). No H6Ks or F1Ms appear to have survived the war. None of these aircraft are airworthy, and some are partial wrecks. None of these aircraft appear to have been used at Truk. Most were recovered in Indonesia or Japan, or were seized for evaluation by the United States after World War II. There are still numerous wrecks of Japanese aircraft at Chuuk. Those that survive to the present are on the sea bottom in Chuuk Atoll. They are popular destinations for dive tourists visiting Chuuk.

FURTHER READING

The story of Truk's aerial reduction was pieced together from various sources. There was a lot written about the campaign scattered among multiple sources, most of which focused on the February 1944 raid. Many recent accounts are dive histories, focusing on the wrecks in the harbor bottom. The only comprehensive account was in a United States Strategic Bombing Survey report issued in 1947 and locked away in a few research libraries. The remaining sources only covered bits and pieces of part of the campaign.

Samuel Eliot Morison covered both US carrier raids in two of his 15-volume history of the United States Navy in World War II, and the US Air Force had a surprisingly comprehensive account of their activities to neutralize Truk in their official history. Operation *Inmate* was pieced together from various Commonwealth histories.

Today, Chuuk (as Truk is now called) is renowned as a diving spot due to all of the wrecks littering Chuuk Lagoon. For those interested in visiting it vicariously and learning more about its role in World War II, I recommend the Pacific Wrecks website: pacificwrecks.com. Check the section on Federated States of Micronesia (Caroline Islands).

Principle sources used for this book are (those marked with an asterisk are available online):

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A pair of Curtis SB2C Helldivers. The Helldiver was replacing the Dauntless as the US Navy's carrier dive bomber in 1944. One aircraft carrier had a Helldiver squadron in the first carrier raid on Truk, three during the second. (AC)

For those interested in a fictional take on the siege of Truk, the redoubtable Dick Dawson, hero of a boy's adventure series about World War II written in the late 1940s, visited it in *Dick Dawson at Truk*. The book can be found online at Gutenberg.org.

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Author's Note:
The following abbreviations indicate the sources of the illustrations used in this volume:
AC – Author's Collection
USAF – United States Air Force
USNHHC – United States Navy Heritage and History Command
Truk and Pearl Harbor are on opposite sides of the International Date Line. This occasionally results in a one-day difference in the date of events, depending on whether the calendar in which it was recorded used the Truk date or Pearl Harbor date. Since these events took place at Truk, I used the local date exclusively.

Author's Dedication
This book is dedicated to Rick Cotton. When pandemic panic shut down interlibrary loan, he along with Ed Rains, another model-making friend, opened their personal libraries for me, allowing me to continue writing uninterrupted. I gave Ed the last book. Rick got this one, due to his interest in the Pacific Theater.